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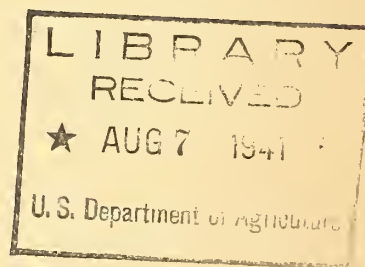


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Farm Planning
FOR
REHABILITATION
BORROWERS

IN
Stearns County, Minn.



by

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CONTENTS

	Page
Introduction	1
Summary and conclusions	1
Importance of planning in rehabilitation	3
Agriculture in Stearns County	5
Farm planning problems in Stearns County	7
Intelligent use of facts	8
Crop yield information	8
Livestock production levels	12
Farm commodity prices	14
Developing cropping systems	16
For economic crop production	16
To insure high-quality roughage	21
To contribute to soil conservation	23
To provide adequate pasture	24
Adequate weed and disease control	25
Developing livestock systems	25
Production problems	25
Provision for adequate replacement of stock	31
Unsatisfactory tenure arrangements	32
Fitting the plan to the situation	35
The farm	37
The client's capital resources	41
The farm operator, his ability and experience	43
The labor supply	43
Supervision of clients	45
Use of the budget procedure in farm planning	46
Purpose of the budget procedure	46
Illustration of the procedure in budgeting	48
Inventory of resources	49
Planning the cropping system	52
Planning the livestock system	55
Calculations of cash expenses and receipts	60
Budgeting alternative organizations	61

FARM PLANNING FOR REHABILITATION BORROWERS IN STEARNS COUNTY, MINNESOTA

By Warren R. Bailey, Assistant Agricultural Economist 1/

INTRODUCTION

This is the second report based on a study of the rural rehabilitation program in Stearns County, Minnesota. The first was a summary analysis of progress made by rehabilitation clients and included a discussion of causes of distress, income before participation in the program, the client's capital resources, the expectations and realization of the progress actually made, and the problem of fitting farm plans to the individual needs of the borrowers. 2/ The purpose of this report is to discuss more fully the problems confronted in planning the organization and operation of farms operated by rehabilitation clients. It is believed that the problems discussed are representative of those confronting other low-income farm groups in the area and, therefore, the report may have wider application than to the rural rehabilitation program alone.

SUMMARY AND CONCLUSIONS

The execution of sound farm and home plans is one of the more important phases of the rural rehabilitation program. The importance of planning is better understood when it is realized that many applicants for rehabilitation loans have been unable to adjust themselves to such factors as low farm prices, drought, and individual differences of farms. To effect a readjustment, many of them need technical assistance and guidance in addition to financial aid. The investment of both the borrower and the Farm Security Administration can be best protected by a wisely drawn farm and home plan, the importance of which is further emphasized if success or failure is to be measured by the extent to which

1/ This is a second report based on a study of rural rehabilitation supervised by Frank T. Hady, senior agricultural economist, Bureau of Agricultural Economics. During the course of the study valuable assistance was given by Dr. George A. Pond of the Minnesota Agricultural Experiment Station. The study was materially aided by the generous cooperation of Mr. J. A. Brinkman, County Supervisor, and Miss Jeannette R. Goldthorpe, Home Management Supervisor, of the Stearns County Rehabilitation Office. In the preparation of the manuscript, valuable aid and criticism were given by Donald R. Rush, agricultural economist, Bureau of Agricultural Economics.

2/ Bailey, Warren R., Rural Rehabilitation Progress in Stearns County, Minnesota. 1. A Summary Analysis. Bur. Agr. Economics, Mar. 1940.

the client follows the plan and its requirements. Furthermore, if the farm and home plan is to embody the objectives of rehabilitation, it must be the focal point for all of the ideals and aspirations of the program.

In approaching the farm-management problem of this low-income group of farmers, one point has been kept constantly in mind -- that the rural rehabilitation borrower is primarily interested in maximum returns in money and living, even though some resources are used in a manner considered inefficient on other farms. Rehabilitation clients cannot readily acquire additional resources and so must make a more economic use of those available.

How alternative lines of production other than dairying are open to farmers in Stearns County. Opportunities for diversification and for supplemental sources of income are, therefore, limited. The rehabilitation problem is further complicated by such factors as small and poor farms, large families, lack of employment opportunities off the farm, and a high rate of mobility among tenants.

The more pressing problems connected with planning the organization and operation of rehabilitation farms in Stearns County and nearby areas are the securing of basic information for farm planning, the development of sound cropping and livestock systems, and unsatisfactory tenure arrangements. Obviously, any farm plan will be only as sound as the information upon which it is based. Lack of data is most serious when the TSA first accepts the client or when the client moves to another farm.

In developing sound cropping systems for Stearns County the general objectives are to maintain a continuous flow of feed crops sufficient to support the livestock system, to secure adequate pasture, and to conserve the soil. These objectives may be reached in Stearns County by a greater use of legume hay and a better choice of small-grain crops. The selection of feed crops should be based on the yield of digestible nutrients rather than the yield in bushels or tons. On many farms, an increased acreage of legume hay should result in increased feed production, improved quality of roughage, and when used as green-manure crops, in increased soil fertility. Clients who are not now participating in the agricultural conservation program should be encouraged to do so if possible.

Breeding, feeding, housing, disease control, and time of production and marketing are important problems in the development of livestock systems in which many clients need technical assistance and guidance. In general, rehabilitation clients will probably be less efficient than other farmers in handling higher grade livestock, but if the costs are not too great, these higher quality animals would probably be economical for them. Artificial insemination may be a practical method of dairy herd improvement and of solving the sire problem in small herds where owning a bull is uneconomic. Each farm situation should be carefully studied to determine whether dairy production from pasture or winter feeding is more economic, considering relative prices and costs of production. Adequate provision must be made for replacement of breeding stock.

An improvement in tenure arrangement is vital to the rehabilitation of many clients and may be facilitated by provision of arbitration facilities to hear cases of landlord-tenant disputes and by participation of the county supervisor in drawing up the contracts and in working out rentals more in keeping with the condition of the farm.

The supervision required by rehabilitation clients consists of information on better farming practices, guidance in planning the use of resources, and advice in allocating income among farm and family needs. The particular situation with respect to the farm, the capital goods, the operator, and the labor supply should be fully considered in planning and in supervision. The budgeting procedure is helpful in making advance estimates of probable results from different organizations of resources in the long run. The procedure is also an aid in planning the production program for any one year. By means of the budget procedure, for either a long-time or short-time period, the best plan for the utilization of available resources can be made.

IMPORTANCE OF PLANNING IN REHABILITATION

One of the important problems confronting the Farm Security Administration in its rehabilitation loan program is that of making farm plans for its borrowers. Without such plans many borrowers may continue to repay their loans and reach a semblance of rehabilitation, others will ultimately win temporary economic independence but will succumb during periods of stress, while others will fail in their effort to become self-supporting. At all events, human and natural resources will have been wasted. Despite the present apparent abundance of resources, those already developed which have any economic use, should not be wasted.

While some rehabilitation clients lost their economic independence through circumstances beyond their control and may quickly recover, others need much more than financial assistance if they are ever to become completely self-supporting. Low farm prices and crop failures owing to drought are among these circumstances; but, in most instances, a number of causes contributed to the economic insolvency characterizing this group. Where the sole or major cause has been low farm prices, drought, or individual happenstances, financial aid to permit the borrower to secure needed capital resources has generally been sufficient to insure successful rehabilitation. However, in many cases the fundamental cause of financial distress was the inability of the farmer to adjust to a changing economic environment. In addition, there are clients who had been farming for only a short time, having been displaced from commerce or industry. Rehabilitation for farmers in the last two groups involves both financial and technical assistance and guidance.

Farmers, as well as other entrepreneurs, having economic self-interests usually endeavor to adjust constantly to their best alternative opportunities as their situations change. Such adjustments, however, are often delayed by outside causes. Not all individuals are aware of a change in their economic situation or of the direction of their best alternative opportunities. Not all producers are equally responsive to

the same stimuli, and not all of them know how to make adjustments after their best alternative opportunities are recognized or pointed out to them.

Many applicants have farming systems which are maladjusted to their resources and they may often be unable to continue farming without help, having exhausted all other credit sources. The Farm Security Administration endeavors, through financial and managerial assistance, to help these farm operators and their families make the adjustments necessary to achieve economic independence. In this role the success of the FSA depends, to a large extent, on the thoroughness with which it understands and undertakes the problem of helping the family make the needed adjustments. By having trained farm-management and home-management specialists who have access to the latest technical information, the FSA can help the farm family more than it could with financial help alone.

Since early in 1936, rural rehabilitation clients receiving standard loans have been required to submit farm-management plans in support of their applications. In these plans, the production and disposal of products, receipts, and expenses connected with the operation of the farm and home, and the surplus cash available for retiring debts are estimated.

The production program in these farm plans has usually been workable with the exception that crop yields and livestock production were often overestimated. The effect of optimistic crop-yield estimates was reflected in lower production of both livestock and livestock products when crop production fell below expectations. Even so, because of their flexibility, the general patterns of these farm plans have been followed by borrowers.

Unfortunately, FSA farm plans have too often projected into the future the maladjustments which had been present in the farm set-up of the client. Though workable, these farm plans often did not represent the most effective combination and use of resources in terms of maximum family income. In many cases, it appeared that the farm plans were designed to justify the loan rather than to rehabilitate the family. There were also indications that farm plans were drawn up only at the time loans were made and were not revised each year. Heavy pressure of work on the county and home-management supervisor and the many changes in regulations have made it difficult to revise plans annually. Fortunately, the emphasis in making farm plans is already shifting from loan justification to sound rehabilitation. Farm plans for both old and new borrowers are now being made.

The importance of sound farm plans to successful and complete rehabilitation of farm borrowers cannot be too greatly stressed. This group of farmers, even with the help of FSA, has little cash reserve to meet emergencies or to take advantage of new opportunities. For example, when crop yields are low, they cannot buy grain to fatten their hogs. Or, when they have excess food supplies, they are unable to buy livestock through which to market their crops. They operate with low cash reserves and cannot adjust to short-term changes in the fashion that independent operators can.

Investments of borrowers and of the Farm Security Administration can be best protected by wisely drawn farm plans. The importance of sound farm plans is further emphasized if the success of the client is to be measured by the extent to which he follows the plan. Fair measures of success depend upon fair yardsticks for measurement. If the farm plan is to embody the objectives of rehabilitation, it is the point at which the ideas and the aspirations in rehabilitation come together.

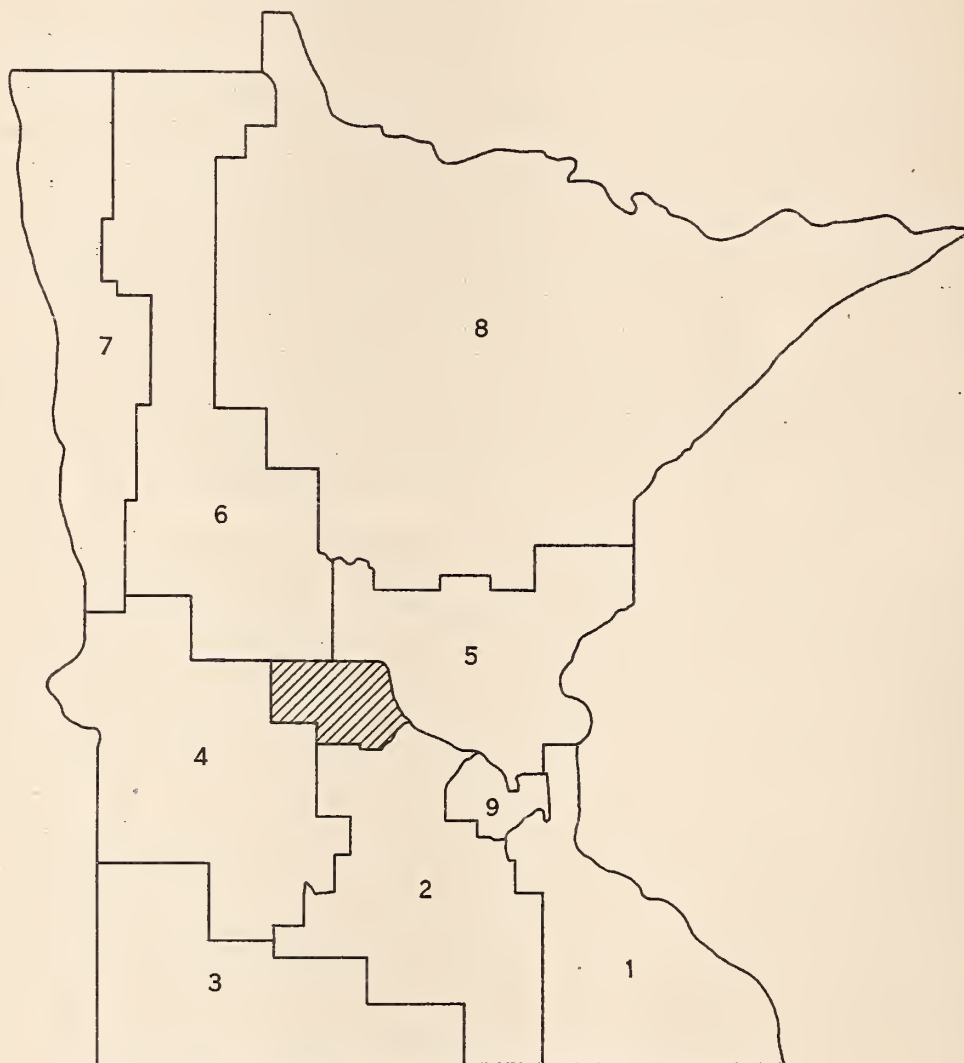
The rural rehabilitation borrower is not primarily interested in the efficient utilization of each of the factors of production (resources) as such. His aim is for maximum net income. It is inevitable, therefore, that some factors will be less efficiently used on the client's farm than on others. If the borrower were in a position to add more of one resource or subtract a part of another until the most efficient employment of each factor was realized, then a larger income and more efficient use of resources would be possible. However, rehabilitation borrowers, and this applies to the entire group of low-income farmers, are not in such a position. They cannot get another cow, a needed piece of farm equipment, or additional labor. They must make the most efficient use of all their resources; those which they bring with them, and those which the FSA helps them to obtain. The following example will illustrate this point.

A rehabilitation client has a surplus of family labor but is unable to use this labor by expanding his farm business, either by renting a larger farm (if a renter) or by purchasing additional land (if an owner). This surplus family labor cannot obtain employment off the farm. Not wishing to lose the services of the surplus labor the client has two alternatives. He may either substitute family labor for other power by performing some operations by hand, and thereby may reduce his cash expense, or he may introduce a labor-intensive cash enterprise, such as potatoes or poultry. In either case, the earnings of the labor may be much lower, representing a less efficient use of this resource than if more flexibility in adding or subtracting other resources were possible. However, insofar as the use of the surplus labor resulted in any additional net income, it is to the farmer's advantage to use it. The approach in the entire discussion which follows will be to suggest methods whereby the total resources now available, rather than individual factors, can be utilized more efficiently and effectively.

AGRICULTURE IN STEARNS COUNTY

Stearns County is the northernmost county of the South Central Dairy Area in Minnesota (fig. 1). Not far to the north and east lie the cut-over regions of the State. Livestock and livestock products are the most important sources of farm income; cash crops such as potatoes, grass seeds, canning crops, and tobacco contribute in a minor way. Dairying is the predominant livestock enterprise with the product mostly sold as butterfat to creameries and cream-buying stations. Skim milk, a byproduct of butterfat production, is largely fed to hogs and poultry. There are no enterprises which can compete with dairying in this area from the standpoint of income, though hog and poultry enterprises are usually the best

LOCATION OF STEARNS COUNTY, WITH RESPECT
TO TYPES-OF-FARMING AREAS, MINNESOTA



1. *Southeastern Dairy and Livestock*
2. *South Central Dairy*
3. *Southwestern Livestock and Cash Grain*
4. *West Central Cash Grain and Livestock*
5. *East Central Dairy and Potatoes*
6. *Northwestern Dairy, Livestock, and Clover Seed*
7. *Red River Valley Small Grain, Potatoes, and Livestock*
8. *Northern Cutover, Dairy, Potatoes, Clover Seed*
9. *Twin City Truck, Dairy, and Fruit*

FIGURE 1

alternatives. Occasionally, farmers keep beef cattle or sheep where the farm is suitable, such instances probably representing the most economic adjustment to the particular situation.

Numerous attempts have been made to augment the farm income by cash crops, but only with moderate success. In the east and north portions of the county, some potatoes are grown, and a few farmers grow tobacco. In the southeastern part of the county, several cooperative canneries have been organized and neighboring farmers plant from 2 to 6 acres of peas. More recently, with the increasing emphasis on soil-building crops in the conservation program, a few farmers find it profitable to produce clover for seed. In some cases bluegrass seed is harvested from the roadsides and in hay meadows. All of these activities indicate efforts to employ more profitably surplus family labor.

The eastern half of the county was settled by immigrants who have large families, and, because of traditional methods of inheritance, farm units have often been subdivided so that they are too small for economic operation. Each new generation is hard pressed to find a place in the economic system. They have little knowledge of employment opportunities. A small number of them find work in local granite quarries, but many have had to remain on the farm. Therefore, agriculture in the eastern part of the county is characterized by a large amount of man labor. Implements are usually small, drawn by two or three horses with many operations performed by hand.

The most common sizes of farms in the western part of the county are 160 and 320 acres and in the eastern part where the most acute problem of surplus population exists they range from 80 to 120 acres in size. Slightly more than one-half the land in farms is tillable in both sections of the county with almost all of the land capable of tillage under cultivation. Nearly all the nontillable land is adjacent to marshes and small streams; permanent pasture often contains brush or stones. The present cropping system includes about one-half small grain, two-fifths corn, with the remainder about equally divided between tame hay, rotation pasture, and other crops.

Present soil fertility varies widely in the county and appears to be closely associated with two factors, the parent material from which the soil was formed and the subsequent management practices. Fortunately, conservation practices which contribute to soil building and maintenance are not difficult to inaugurate. Red and alsike clover grow readily wherever seed has fallen, lining is usually not necessary to obtain good stands, and alfalfa can be easily grown. The relatively small amount of legume hay now produced can probably be attributed to the drought in 1934 and 1936, and to the pressing need for concentrates. Legume hay seedlings destroyed by the drought are being replaced.

FARM PLANNING PROBLEMS IN STEARNS COUNTY

Many of the farm-planning problems confronting FSA clients in Stearns County are not peculiar to the farms which they operate. The

problems of developing cropping systems for poor soils, of securing a balance between the crop and livestock enterprises, and of developing a plan for large families on small farms are directly related to local conditions. As there are other farm-planning problems having more widespread occurrence in farm organizations in the area, however, it seems appropriate to discuss some of these problems. Not all of the problems occur on all farms, some of them on very few, but all are significant to the development of sound farm planning in the area.

Intelligent Use of Facts

Fundamental to sound farm-management planning is the procurement and intelligent use of facts. Obviously, any plan will be only as sound as the information upon which it is based. No one realizes the need for accurate information more than the County FSA Supervisor. He is desirous of knowing more about the farm operated by his clients, about the clients, themselves, and about their families. He wants to know what crop yields can be expected, how much milk the new cow will produce, and what hog prices are likely to be next fall.

The need for reliable factual data is most pressing at the time the FSA accepts the rehabilitation client. Few of the applicants have adequate farm records. Sometimes after much probing, they may find last year's crop yields on the back of an old envelope. While the case is being considered by the County Supervisor, and while the farm and home plan is being developed, the need for accurate information is very real. In the absence of reliable data, estimates must be made of what a farmer may be able to accomplish. What he can or will accomplish will often be quite a different matter. After the client has kept records for a few years, and the supervisor becomes better acquainted with him and observes what the land will produce, then the original plan can be revised with more confidence. What is needed is specific information regarding the area upon which to make estimates when the client is first being considered for a rehabilitation loan. It is probable that all available sources of information have not been fully explored and that the pertinent data available have not been assembled in readily usable form.

Crop Yield Information

In studying actual performance as compared to that which was estimated, it was found that crop yields were less than those estimated in the farm plans (table 1). In 1936, this fact can be explained by the severity of the drought. In 1937 and 1938, however, crop yields in Stearns County were slightly above the long-time average, yet, even in these 2 years, actual yields were below estimated yields on rehabilitation farms. There are several reasons for this. Many clients are below average in managerial ability. Others had not operated the particular farm the previous year and were, therefore, unfamiliar with the soil. Although all clients have had farming experience, they could not be expected to adapt themselves immediately to farming conditions in new communities. It seems, too, that rehabilitation clients operate poorer farms. Any estimates of crop yields, therefore, must be adjusted to these factors.

Table 1.- Average estimated and actual crop yields of FSA rehabilitation clients in Stearns County, Minnesota, compared with Stearns County average yields and with adjusted county yields, 1936-38

Item	1936 1/				1937 1/				1938 1/			
	Farm plan	Actual	as per-	Actual	Farm plan	Actual	as per-	Actual	Farm plan	Actual	as per-	Actual
	Esti- mate	Actual	centage of es- timate	Esti- mate	Actual	centage of es- timate	Esti- mate	Actual	Esti- mate	Actual	centage of es- timate	Actual
Grain:	Bushels Percent Bushels Percent Bushels Percent Bushels Percent Bushels Percent Bushels Percent Bushels Percent Bushels				Bushels Percent Bushels Percent Bushels Percent Bushels Percent Bushels Percent Bushels				Bushels Percent Bushels Percent Bushels Percent Bushels Percent Bushels Percent Bushels			
Corn	Per acre:	28.9	5.9	20	28.9	22.4	78	31.6	27.0	85	27.6	24.8
Wheat	do.	15.0	5.2	35	15.4	12.9	84	19.5	13.0	67	12.6	11.3
Oats	do.	33.4	9.8	29	34.2	26.9	79	35.5	23.2	65	31.1	28.0
Barley	do.	28.9	6.4	22	26.5	20.7	78	28.9	19.0	66	25.5	23.0
Rye	do.	18.4	7.4	40	17.4	17.2	99	20.2	15.9	79	16.8	15.1
Mixed grains	do. 3/	34.3	7.7	22	35.5	26.5	75	35.0	20.4	58	-	-
Total grain production	per farm	1,841	505	27	2,008	1,354	67	2,176	1,391	64	-	-
Hay:												
Alfalfa	Per acre:	2.5	1.5	60	1.9	1.9	100	2.3	2.2	96	-	-
Clover and timothy	do.	2.0	1.7	85	1.9	.9	47	1.9	1.6	84	4/ 1.5	4/ 1.4
Wild hay	do.	1.5	.9	60	1.5	1.5	100	1.7	1.1	65	1.0	.9
Total hay production	per farm	35	17	49	38	37	97	52	39	75	-	-
Miscellaneous crops												
Flax	Per acre:	8.7	4.0	46	-	-	-	-	-	-	8.4	7.6
Potatoes	do.	-	-	-	98.2	59.1	60	86.0	48.3	56	83.8	75.4

1/ Includes 51 cases in 1936, 28 in 1937, and 25 in 1938. Some of the cases included differ from year to year.
 2/ Ninety (90) percent of column 10.
 3/ Usually oats and wheat or oats and barley. 4/ Tame hay.

In 1937 and again in 1938 the average total grain production on rehabilitation farms was only about 65 percent of the production estimated in the farm plans. If the livestock systems had been organized to use the entire estimated crop production, those systems had to be changed. If the livestock production were to proceed as planned it was necessary to purchase additional feed. However, in most cases all livestock production proceeded at a lower level than planned or some of the enterprises were sharply curtailed. When crop production is low in this area, the dairy enterprise usually has first claim to available feed. If the feed shortage is severe, only the producing cows are kept; and the young stock, hogs, and chickens are sold or otherwise reduced in numbers. As many clients were not able to purchase feed, the fact that actual grain production in 1937 and 1938 was only two-thirds as large as expected meant that the size of the client's business and his farm income were seriously reduced. This resulted in difficulty in meeting the debt payments and in a reduced standard of living. In 1937, hay production was about equal to that estimated. Therefore cattle and sheep enterprises could continue nearly as planned. In each of the three years, actual production did not fall so far below estimated production in the case of hay as with grains. Production of poultry and hogs probably suffered more than that of cattle and sheep.

In certain instances, fewer acres were planted than had been planned because of errors in estimating the size of fields. Such errors should not occur if fields have been measured by the agricultural conservation program. In some instances, minor changes in the crop plan were made at the time of planting. These changes, however, had little influence on the total production of the farm. Errors may have occurred in yield estimates because reported crop yields (the principal source of yield data) are based on harvested acres rather than planted acres. However, for many crops these errors could be reduced by securing unpublished data on yields for planted acres from the Agricultural Marketing Service. The comparisons in table 1 are valid, however, because both actual yields and county average yields are based on harvested acres.

It was in the search for more information on the productivity of the land that the farm-productivity ratings of the agricultural conservation program were examined. These ratings resulted from a mapping project conducted by township committeemen in December 1937 and January 1938. Each field on the farm was scored on amount of slope, degree of erosion, inherent productivity, and present productivity. The composite score of these factors was weighted by the measured area of the field, and composite scores for the farm were derived. When the work had been completed, a composite or weighted average score of these physical factors for the county was computed. When the county average score was divided into the score for the individual farm an index was derived. 3/

3/ The data for these computations may be found on Form NCR-203 (for the farm) and on NCR tabulation sheets (for the townships and county) in the files of the county ACP offices. The index thus obtained should not be confused with the productivity index which the ACP finally used in its program. The latter index is a modification of the former according to the cropping history of the farm, production quotas for the county, and other factors.

When the productivity ratings, thus derived, for FSA farms were compared with the average productivity for the county, it was found that they were about 90 percent of the county average with a range from 70 percent to 110 percent (table 1). Crop-yield estimates in the farm plans for 1936-38 were higher than county average yields. Instead, average yield estimates should have been about equal to those found in column 11. These represent county average yields adjusted to the lower productivity characterizing the rehabilitation farms which were studied. These data indicate that the productivity rating for a group of farms is helpful in relating the average productivity of the group to other farms. The question then occurs as to how reliable the productivity index would be in estimating average yields on the individual farm.

In order to test the reliability of such estimates, actual yields on 42 FSA farms in 1937 (and 1938) were used. The county average yield of corn (31 bushels) for 1937 was multiplied by the individual farm-productivity indexes to obtain estimates for each farm. The average corn yield, estimated by this method, for the 42 farms was 28.2 bushels, whereas the average actual yield was 24.0 bushels. This discrepancy may have resulted from too high an index for these farms, or from failure of actual yields to equal estimated yields because of poorer managerial ability of the clients, or from a combination of these two factors.

The first estimates were adjusted downward so that the average of adjusted estimates was equal to the actual average. When the resulting estimated yields were compared with the actual yields, the average deviation (difference) between the actual and estimated yields of corn was 3.8 bushels. On the other hand, if the average actual yield for the 42 farms (in 1937) had been used as the estimate for all farms, the average deviation would have been 5.1 bushels. These calculations show that by the use of farm-productivity indexes more reliable estimates of corn yields can be made than when the average yields of a group of farms are used as the estimate for all farms. When the estimates for 2 years (1937 and 1938) were averaged and compared with the average actual yields for the same period, by farms, the average deviation (difference) was 3.4 bushels, compared to a deviation of 3.8 bushels when data for 1 year (1937) were taken.

Thus far, the discussion has concerned but one crop, corn. Would the productivity index method of estimating yields be reliable for other crops, or for all crops? In answering this question, a composite of actual yields of all crops, commonly called a crop-yield index, was compared with the productivity index, by farms, with results similar to those obtained in the case of corn. These tests indicate a reasonable degree of reliability for crop-yield estimates based on productivity ratings. The tests were based on 2 years' data only. If a longer period of actual yields had been available, the results might have shown even greater reliability for the productivity indexes.

The employment of ACP productivity ratings should not exclude other sources of information in estimating crop yields. Soil differences are likely to affect the reliability of the productivity index as a measure of yields of different crops. For example, it was observed that farms with

sandy soil generally had low productivity indexes. Yet sandy soils produce as high and sometimes higher than average yields of rye. Yields based on these indices can be only first approximations. They are a method of relating county average yields to the individual farm in the absence of detailed soil maps and actual yield records of the farm. Where detailed soil maps are available and county average yields can be adjusted according to soil types, fairly reliable estimates should be possible. Actual yield records on neighboring farms or on farms with similar soil types may be available, and, if so, they may be used to advantage. Each county supervisor should endeavor to develop crop-yield estimates of his own for various parts of the county. However, after a client has operated a farm for several years, the records of actual yields he has secured should supersede estimated data.

Livestock Production Levels

For the development of farm-production plans it is necessary to secure estimates of the probable amounts of livestock and livestock products which will be produced. Frequently, reliable data for such estimating are not available, particularly in the case of new clients. As a consequence, standard or average rates of production adjusted to conditions on the particular farm must be used. However, regardless of the care with which secondary sources of livestock-production data are employed they are not so applicable as actual records. Therefore, clients should be encouraged and assisted in the keeping of accurate records of their farming operations. Reliable estimates of production are necessary for two purposes, one for the calculation of probable income and the other for the selection of enterprises which should be given the most emphasis.

It was pointed out in a previous report that estimates of livestock production on rehabilitation farms in Stearns County have in the past been too optimistic. ^{4/} The estimated butterfat production per cow was not realized, with the result that the client's income was below that expected. In certain instances the number of pigs per litter, the number of hogs available for sale, the number of eggs per hen, and the number of poultry available for sale were over-estimated. In some cases these estimates were not realized owing to accidental factors, but the original estimates were often too optimistic.

Since rehabilitation farm records are now available in most areas, they are probably the most adequate source of livestock-production data for making estimates in the development of farm plans. An analysis of these records showing the average production and range in rates of production per unit of livestock should be of material assistance to county supervisors. The livestock-production program of the new rehabilitation client could then be appraised with respect to the group, and an estimation of performance could be made accordingly. Such a procedure would probably result in production plans somewhat more realistic than those of the present.

Another problem in the reorganization of rehabilitation farms is the effect of changes in ratios on the production of an animal. This

^{4/} See Bailey, Warren R., op cit., pp. 14-17.

problem is most important in the case of the dairy enterprise, where it is necessary to know the effects of increased feeding, or of feeding a ration containing more protein and mineral.

That it is possible to influence the production of milk by changing the quantity of feed has long been recognized. A study is now in progress which has as its objective a more precise determination of the relationship between feed input and milk output for cows of a given productivity. A preliminary report on this study is now available. ^{5/} It has been the assumption that practically all feed in excess of that required for maintenance and for milk production, would result in increased body weight. Hence, the usual feeding recommendations have been to weigh the daily milk production and adjust the ration accordingly, after allowing for body maintenance. Jenson found that cows do gain some additional weight under "excess" feeding but that with dairy breeds the gain was relatively small and the increase in milk yield was very substantial. In the case of rehabilitation clients, however, the feeding problem is more often that of estimating the effect of changes from substandard to standard rations rather than the effect of "excessive" feeding. From the experimental results reported, it appears that farmers who feed below the standard requirements are not penalized quite as much as formerly believed. In the case of each cow, however, there appears to be a most profitable level of feeding under certain conditions of milk and feed prices and clients should strive for that level.

Another problem is that of estimating the effect of a change in the proportion that digestible protein is of total digestible nutrients. An estimate of the effect of this nutritive ratio on milk and butterfat production is found in the work of Esckiel, Pond, and others, and data from these studies are presented in table 2.

These data show that the expected production of milk or butterfat is much greater if the ration includes a large proportion of protein (a narrower nutritive ratio) even though the quantity of total digestible nutrients is not changed. Although not entirely comparable, the data from the two studies indicate the same general relationship between nutritive ratio and production. While they do not show the experimental results of changes in ration in the case of a particular cow or herd they suggest what can be expected.

^{5/} Jensen, Einar, Determining Input-Output Relationships in Milk Production. Bur. Agr. Economics, Farm Management Report No. 5, Washington, D. C., Jan. 1940.

Table 2.- Average relation between dairy production and nutritive ratio 1/

	:	Wisconsin	:	Pine County, Minnesota
	:	Milk produced per	:	Butterfat produced
Nutritive ratio	:	unit of total	:	per unit of feed
	:	digestible nutrients	:	
	:	(1)	:	(2)
	:	Percent of production expected		
	:			
1:11.5	:	82.3		-
1:11.0	:	86.7		-
1:10.5	:	90.5		-
1:10.0	:	92.9		-
1: 9.5	:	94.6		-
1: 9.0	:	96.4		93.8
1: 8.5	:	98.3		96.2
1: 8.0	:	101.6		98.0
1: 7.5	:	107.5		99.3
1: 7.0	:	111.7		100.5
1: 6.5	:	-		101.1
1: 6.0	:	-		101.6
	:			

1/ In both studies the effects of all other factors were held constant. The results are related in each study to the average ration fed and average fat content of milk, of the group of farms studied.

Source of data:

- (1) Ezekiel, M.J.B., McNall, P.E., and Morrison, F.B., Practices Responsible for Variation in the Physical Requirements and Economic Cost of Milk Production on Wisconsin Farms. Wis. Agr. Expt. Sta. Res. Bul. 79, table X, Aug. 1927.
- (2) Pond, G.A., and Ezekiel, M.J.B., Factors Affecting the Physical and Economic Cost of Butterfat Production in Pine County, Minnesota. Minn. Agr. Expt. Sta. Bul. 270, table 6, p. 25, Dec. 1930.

Farm Commodity Prices

Another type of data needed by FSA supervisors and rehabilitation clients is more reliable estimates of farm commodity prices. Specific prices of a commodity are needed as well as information as to the general price level. Accurate information on prices is necessary in order to permit appraisal of the several alternative enterprises which may be included in the farm organization. Probably two sets of price data would be useful in the rehabilitation program. First, there would be longer term price prospects which could be expected during the period that the rehabilitation loan was being repaid. Price data of this nature would indicate the normal or average income probabilities and the debt-paying ability of the farm business. It would help to indicate the soundness of the rehabilitation program in the particular situation.

The second type of price data needed by FSA supervisors and clients is of a short-run character, that is, prices which may be expected for the next marketing season. This information would serve to indicate what part of the loan could be paid back during the next year. In fact, two farm plans, one as the basis for making long-term rehabilitation loans, and the other as an estimate of the next year's income, would be helpful. Information on immediate price prospects is necessary to permit short-term adjustments in the production plan to take advantage of temporary changes in relative prices. Such short-term adjustments, however, do not invalidate the essential soundness of the long-term organization plan.

Farm commodity prices have two apparent tendencies. In general, over a long period of time, prices of various commodities bear to each other a fairly stable relationship. To the extent that long-term prices have such relationships they can be used in long-time production or organization plans. Short-term prices, on the other hand, seldom maintain stable relationships. Some prices get out of line with respect to other prices. To take advantage of shifts in short-term price relationships, temporary adjustments in production plans must be made.

A brief review of sources of price data is in order. Estimates of future prices must be founded on future prospects, but probable conditions are hard to predict. Data must be examined for the present and apparent trends of the past as an aid in estimating future prices. In the case of long-term prices the past may be farther explored than for short-term prices. For commodity-price prospects, information contained in the annual agricultural outlook report, various State publications, and Farm Business Notes of the University of Minnesota 6/ are the best sources. For current price information, market releases, newspaper and radio reports, etc. can be used. For long-term prices, data collected by the Crop and Livestock Reporting Service, Agricultural Marketing Service,

6/ Agricultural Outlook Report, published annually by the U. S. Department of Agriculture, Washington, D.C. (free) containing estimates of production and indications of the direction of price changes for the major farm commodities.

The Agricultural Situation, Bur. of Agr. Economics, U. S. Department of Agriculture, Washington, D.C. Monthly, 25 cents a year, free to workers of the U. S. Dept. of Agriculture, contains short statements on the situation with respect to the more important agricultural products as well as articles of general agricultural interest.

Minnesota Livestock Outlook for 1940, Extension Pamphlet 64, Jan. 1940, and Dairy and Poultry Outlook Minnesota - 1940, Extension Pamphlet 63, Nov. 1939, University Farm, St. Paul, Minn. (free). Contains a discussion of factors affecting prices and the probable direction of change.

Farm Business Notes, prepared by Divisions of Agricultural Economics and Agricultural Extension Service, University Farm, St. Paul, Minn., monthly (free). Contains monthly average prices and indexes of farm commodities.

U. S. Department of Agriculture, and the Minnesota Department of Agriculture are the most reliable.

Price data from the above sources are usually in the form of weighted seasonal averages for each commodity. Various grades and quality of product commanding various prices have been averaged in these reports. In using the data for estimating probable prices, the supervisor should consider the quality of product which the particular operator markets.

Developing Cropping Systems

The problem of developing cropping systems on rehabilitation farms is made more difficult by the frequent movement of many clients from farm to farm. An improvement in tenure arrangements is vital to the rehabilitation of many clients. This will be discussed in a later section. Because of this constant moving, it may seem futile to attempt any improvement of cropping systems, at least of those improvements which take more than 1 year to realize from the investment of time or capital required. Where poor cropping systems do exist, they are usually the cause and the result of the constant shifting among tenant farmers. It is probable that better cropping systems should increase crop yields and would make the available farms more acceptable to the rehabilitation client. Not all measures to improve cropping systems are of a long-time nature; therefore, it is probable that, with even reasonable assurance of tenure, a rehabilitation client may initiate improved cropping programs, as increased returns will defray the costs even before the full benefits have been realized.

Needed adjustments in the cropping systems of borrowers in Stearns County are of two general types. One is a redistribution of tilled land between small grain, intertilled crops, and hay. The other is in the selection of small-grain crops. Regardless of size of farm, or percent of land tilled, present cropping systems vary little on FSA borrowers' farms. The general statement can be made that cropping systems could be improved by reducing small grain and increasing legume hay. This change would not only improve the crop rotation, but it would also help the borrower balance his dairy cow ration.

For Economic Crop Production

An intelligent choice of the type of small grains to be grown may increase the total production of concentrates on many farms. Available data on yields and nutritive content indicate that certain crops produce more units of feed than others. Corn, barley, and tame hay are the highest feed-unit yielding crops in Stearns County (table 3). Where most of the crop production is to be fed, the choice should be made on the basis of estimated yield in terms of pounds of grain or of total digestible nutrients rather than in terms of bushels. In pounds of grain, the average yield of barley is about one-fourth greater than the yield of oats, rye, or wheat. The yield of wheat in pounds is somewhat less than oats and rye. The ranking of these crops is changed but little when yield is expressed in total digestible nutrients. This is another important factor in the choice of crops, especially for the rehabilitation client who must

rely to a large extent on home-grown feeds. Oats have a higher percentage composition of protein than corn, barley, rye, or wheat. ^{7/} Alfalfa hay is the roughage highest in protein and, in this area, is probably the cheapest source of protein for the dairy ration. ^{8/}

Table 3.- Average crop yields in Stearns County, 1921-38

Crop	: Bushels or : : tons : : (1) :	: Pounds of : : grain : : (2) :	: Pounds of : : T.D.N. : : (3) :	: Pounds of : : digestible : : protein : : (4) :
	: <u>Bushels</u> :	: <u>Pounds</u> :	: <u>Pounds</u> :	: <u>Pounds</u> :
Corn	28	1,568	1,278	114
Barley	26	1,248	962	121
Oats	31	992	689	101
Rye	17	958	785	87
Spring wheat ...	13	780	618	69
Flax	8	-	-	-
Potatoes	84	-	-	-
	: <u>Tons</u> :			
Tame hay	1.5	-	<u>1/</u> 1,521	<u>1/</u> 258
Prairie hay ...	1.0	-	966	56

^{1/} Assuming 20 percent alfalfa, 30 percent clover, and 50 percent timothy.

Source of data:

Columns (1) and (2), Minnesota State Department of Agriculture, Dairy and Food; Minnesota Crop and Livestock Statistics, published annually. Columns (3) and (4), Gullickson, T.V., and Fitch, J.B., Feeding the Dairy Herd. Minn. Agr. Expt. Sta. Bul. 218, rev. 1938, table 5.

There appears to be no basis for the contention that risks of crop failure are greater with some crops than others, for the coefficient of variability in county average yields differs but little among the common crops. Crop failure and yields, however, do differ according to soils. Data from farm-account records indicate that rye produces higher yields than other small grains on light sandy soils. This is confirmed by the observation that rye acreage is greater in the sandy areas of the county. In planning cropping systems for FSA borrowers, crops which give the highest yields on the type of soil prevailing on the individual farm should be selected.

^{7/} For the composition of feeds see Morrison, F. B., Feeds and Feeding, Ed. 20, rev. 1939, Appendix tables I and II; and Gullickson, T.V., and Fitch, J.B., Feeding the Dairy Herd, Minn. Agr. Expt. Sta. Bul. 218, rev. Jan. 1938.

^{8/} For a comparison between alfalfa and other roughages in percent of protein see table 6, p. 25.

The comparative acreage of various crops in Stearns County and a group of FSA farms in the county is shown in table 4. Oats comprise about one-half, wheat and barley each about one-fifth, and rye about one-tenth of all the small grain produced in the area. On the basis of average yields, one would expect to find a larger acreage of barley and rye, and less oats. Some other causes, not economic in nature, probably account for the continued high acreage of low-yielding crops. The persistence with which some farmers continue to produce low-return crops has not been satisfactorily explained. It is probably due, in part, to inertia, habit, failure to recognize the relative productivity of crops, real or imagined difficulties in production, or a lack of understanding of the possibilities of substitution of the various crops in livestock rations.

Table 4.- Cropping and land use systems in Stearns County, Minnesota, 1938

Crop or land use	Average of county			Average of 48 FSA farms		
	Acres	Percent	Percent	Acres	Percent	Percent
	per	of	of all	per	of	of all
	farm	cropland	land	farm	cropland	land
	(1)	(2)	(3)	(4)	(5)	(6)
Winter wheat	1.0	1.0		1.2	1.5	
Spring wheat	9.0	8.8		5.8	7.1	
Oats	26.1	25.3		20.9	25.4	
Barley	11.1	10.8		6.6	8.0	
Rye	6.4	6.2		6.9	8.4	
Mixed grains	-	-		4.2	5.1	
Small grain	53.6	52.1		45.6	55.5	
Corn	21.2	20.6		19.3	23.4	
Flax	.8	.8		-	-	
Alfalfa & clover ^{1/}	7.8	7.6		4.8	5.8	
Clover & timothy	2.6	2.5		3.1	3.8	
Other tame hay	2.4	2.3		2.7	3.3	
All tame hay	12.8	12.4		10.6	12.9	
Potatoes	1.0	1.0		1.2	1.5	
Other crops	.2	.2		1.2	1.5	
Rotation pasture	2.8	2.7		1.5	1.8	
Idle cropland	9.9	9.6		2.8	3.4	
Tillable land	103.0	100.0	59.2	82.2	100.0	54.1
Native hay	16.3		9.4	16.7		11.0
Native pasture	47.7		27.4	41.6		27.4
Homestead, waste, etc. ...	6.9		4.0	11.4		7.5
Non-tillable land	70.9		40.8	69.7		45.9
All land in farm	173.9		100.0	151.9		100.0

^{1/} Includes red, alsike, and sweet clover.

Source of data: Col. 1, Minn. State Dept. Agr., Dairy and Food, Minnesota State Farm Census, 1938, Bul. 29. Col. 4, Farm account records, FSA. Col. 2, 3, 5, 6, calculated.

FSA borrowers have smaller than average-sized farms in Stearns County. In 1938 rehabilitation clients' farms average 152 acres, while the average size of all farms in the county was 174 acres. Borrowers' farms also have a slightly smaller proportion of their land tillable, 54 percent compared to the 59 percent average for the county. Both groups had about the same percentage of the total farm area in native pasture, but other farmers have a larger percentage of rotation pasture than borrowers. A smaller percentage of the land on all farms in the county is in native hay, farmstead, waste, and roads than on borrowers' farms.

FSA borrowers have a slightly higher percentage of tillable land in small grain, corn, potatoes, and tame hay, and a lower percentage in legume hay, rotation pasture, and idle cropland than the average for the county. If it is assumed that 40 percent of the clover and timothy mixture is clover, borrowers have an average of 6.0 acres of legume hay, whereas the county average is 8.8 acres. Variation in legume-hay acreage among borrowers' farms is shown in the following table.

Table 5.- Frequency distribution of FSA rehabilitation borrowers' farms according to acres of legume hay, 1938 ^{1/}

Acres	:	Number of farms
None	:	16
0.1 - 2.4	:	1
2.5 - 4.9	:	3
5.0 - 7.4	:	7
7.5 - 9.9	:	7
10.0 - 12.4	:	4
12.5 - 14.9	:	2
15.0 and over	:	5
Total	:	45

^{1/} Includes alfalfa, red, alsike, and sweet clover. No borrowers had made use of annual legumes.

One-third of the borrowers have no legume hay and more than two-thirds have less than 10 acres. Although not available, crop data for 1939 would probably show some use of soybeans as an annual legume-hay crop. It is among these borrowers without legume hay that the greatest adjustment in cropping system should take place.

Another consideration in the choice of crops grown for feed is the adaptability to livestock feeding. In general, the grains are interchangeable to a considerable extent in livestock rations. Oats and barley are almost perfectly interchangeable in the grain ration of dairy cows. Barley compares more closely to corn as feed for hogs. Neither rye nor wheat should be fed alone, but grain mixtures including wheat or rye can

be economically fed to fattening hogs. When a client has excess supplies of wheat or rye, he might trade those grains for oats or barley. On farms with sandy soil, more pounds of rye than oats or barley usually can be grown per acre. However, many farmers believe oats to be the ideal grain for horses and will grow them for that purpose regardless of the adaptability of the farm to that crop.

After yield and adaptability to livestock rations have been considered, the choice of crops depends on the cost of production. High-yielding crops may involve higher, but not proportionately higher, production costs. The rehabilitation client is more concerned with relative rather than absolute costs of crop production. It is to the client's advantage to adjust his cropping system to increase total production and yet not increase his costs, or to increase costs by less than the value of the additional crop production.

Farm-management cost studies in Minnesota have shown that in general small grains and tame hay require about the same amount of man labor and horse work per acre. ^{9/} Corn requires about twice as much man labor and three times as much horse work per acre as small grain and tame hay. There are some conditions on rehabilitation farms in Stearns County which tend to narrow, and other conditions which tend to widen these differences in labor and power requirements. For example, the soil on many of the farms is low in humus, thus making tilth very poor. This is particularly true with the silty-clay soils which, as a result, require special tillage. Some clients plow the land in the fall and again in the spring for both small grain and corn. Man-labor and horse-work requirements in seed-bed preparation tend to be equal for both types of crops. The usual practice on farms which are low in humus and where the land has been in corn is to plow before seeding small grain. On the lighter soils, disking may take the place of plowing. This, of course, entails less labor and power. Another practice which tends to increase the labor and power requirements of corn production is the necessity of cultivating corn to eradicate quack grass. In some instances fields were cultivated 10 or more times. Cultivations beyond the first four probably added little to the yield and can be justified only as weed control.

The direct cash costs for services and material in the production of field crops in this area are mainly seed, twine, and threshing. With the use of hybrid seed corn, the per-acre seed costs for this crop are about equal to those for small grain. However, this is an out-of-pocket cost, while seed for small grain is ordinarily produced on the farm. Hybrid seed corn well adapted to the locality can be purchased for \$3.50 to \$7.00 per bushel. ^{10/} On this basis the cost per acre will be from 60 to 90 cents, which is about equal to the cost of seeding locally grown

^{9/} Minn. Agr. Expt. Sta., Div. of Agr. Econ., Mimeo. Reports No. 54, Rock and Nobles Counties 1932; No. 59, Stevens County, 1933; No. 65, Stevens County 1934; No. 76, Winona County, 1936; No. 100, Winona County, 1938.

^{10/} In grading seed corn, the round and flat kernels are separated. The lower price applies to "rounds" and the higher price to "flats." These prices were obtained from farmers in the survey.

small grains. Since most of the corn produced in this area is harvested with a binder, twine is a cash expense and is about the same as for an acre of small grain.

In developing cropping systems, the selection of high-yielding and well-adapted varieties is important. Hybrid seed corn adapted to Stearns County is available. Under average soil conditions and management practices, the additional yield over open-pollinated types is undoubtedly worth the added cost. However, care should be taken to use only seed which is well-adapted to the limited growing season of the area. Some Stearns County farmers have used hybrid seed, developed for conditions farther south, with very unsatisfactory results. Only seed with labels stating the name of the type, the varieties crossed, and the length of growing season required for maturing, as well as the moisture content and percentage germination should be purchased. Most of the seed for small grains is produced in the area, and there is little likelihood of getting varieties not adapted to the region.

To Insure High-Quality Roughage

A phase of the cropping system most often neglected by FSA borrowers in Stearns County is adequate provision for high-quality roughage. Roughage should contain a medium to high percentage of protein and abundant minerals. Alfalfa hay most nearly meets these requirements. Both red and alsike clover usually contain less protein and potash than alfalfa. Too many borrowers rely entirely on wild hay, corn stover, and straw from the small grains. It was pointed out that one-third of the clients produce no legume hay whatsoever. If there is no available roughage that is high in protein, a protein supplement is needed to "balance" the dairy ration. Wheat bran, middlings, oil meal, cottonseed oil cake, and soybean meal are the usual mill foods available. Farm plans providing for the purchase of these supplementary foods have been drawn up on some farms, but without success as clients needing the feed were without the necessary cash to buy it.

Clients are most likely to use a balanced ration when farm-produced roughages, high in protein, are available. A dairy-cow ration which includes roughages consisting only of wild hay, corn stover, and straw will be more efficiently utilized if concentrates are fed. Legume hays have long proven their worth as roughage in the dairy ration. Improved cropping systems to permit maximum crop production will likewise contribute to better balanced dairy rations by making increased amounts of concentrates and high-quality hay available for feed.

Tenant-borrowers with 1-year leases hesitate to seed crops whose productivity will not be realized for several years, particularly when they have to furnish the seed. It is not easy, and it may be impossible, for tenants to secure reimbursement for the unexhausted value of improvements such as alfalfa seedings. Those with reasonably secure tenure have in some cases felt that they could afford to take the chance of realizing on their investment. With increasing emphasis on soil-building practices in the agricultural conservation program both owners and tenants have had more inducement to increase their seedings of legumes.

An annual legume that will probably do much to solve the problem of quality in roughage is just appearing on rehabilitation clients' farms. This crop is soybeans. A return from the investment in seed can be realized in 1 year, making it appealing to tenant operators with 1-year leases. Varieties adaptable to the area and cultural practices are discussed in a recent Minnesota extension bulletin. ^{11/} The seed and hay are high in protein as the soybean plant is a legume. A comparison of the feeding value of soybean hay and other roughages is shown in table 6.

Table 6.- Average digestible protein, digestible nutrients, calcium, and phosphorus in selected dry roughages

(100 pounds of feed)				
Dry roughage	Digestible proteins	Digestible nutrients	Calcium	Phosphorus
	Pounds	Pounds	Grams	Grams
Sweet clover hay	10.9	50.7	548.9	93.0
Alfalfa hay, medium early cut	10.4	51.5	390-839	50-160
Soybean hay	7.9	50.0	430.9	115.6
Alsike clover hay	7.9	47.3	360.0	97.0
Red clover hay	7.4	49.6	541.6	81.6
Mixed hay ($\frac{1}{2}$ clover, $\frac{1}{2}$ timothy)	5.1	49.3	366.1	76.5
Reed canary grass hay	4.5	52.3	-	-
Sudan grass hay	3.7	51.4	-	-
Corn fodder ^{1/}	3.7	48.1	97.0	65.0
Timothy hay	2.9	48.0	79-188	42-109
Prairie hay	2.8	48.3	118-310	16-50
Corn stover	2.0	36.4	165.4	40.0
Oat straw	1.0	45.6	161.9	64.9

^{1/} Contained no data on grain content.

Source of data: Gullickson, T. W., and Fitch, J. B., Feeding the Dairy Herd. Minn. Agr. Expt. Sta. Bul. 218, rev., Jan. 1938.

Soybean hay contains about the same amount of digestible protein and a higher percent of total digestible nutrients than alsike or red clover hay. It is somewhat lower than sweet clover hay and alfalfa hay in digestible protein. Soybean hay also contains an abundance of calcium and phosphorus compared to the other roughages (table 6).

^{11/} Army, A. C., Brookins, W. F., Hodgson, R. E., Soybeans for Minnesota. Minn. Univ. Agr. Expt. Div. Spec. Bul. 134, rev. Aug. 1937.

To Contribute to Soil Conservation

Generally speaking, the soils of Stearns County are not so seriously eroded or so depleted in fertility that they are beyond repair. Good farming methods, as understood by the better farmers in the area, would undoubtedly do much to restore original productivity. By no means all of the poor land in the county is operated by Farm Security Administration borrowers. A larger proportion of FSA borrowers than other farmers are located on poor land, however. Although there were no comparable estimates on other farms, survey data indicate that about one-fifth of the farms operated by FSA borrowers have soils badly depleted in fertility either from erosion or "soil mining" practices, and two-fifths have soils moderately depleted. On the balance, soils were only slightly damaged. The responsibility for this exhaustion in soil resources is not to any extent that of the FSA borrowers, few of whom have operated their present farms for long. However, clients can be blamed for not doing anything to correct the trouble.

Few FSA borrowers follow systematic and constructive soil-building practices. About two-thirds of the borrowers are participants 12/ in the agricultural conservation program, but few are earning all of the "soil building credits" they could earn under its regulations. Compliance consists largely of meeting the cropland-limitation goals and only to a small extent do they follow recommended soil-building practices. Yet many FSA borrowers operate the farms which badly need these practices. Even though these borrowers were to earn all of the "soil building credits" possible under the agricultural conservation program, their cropping plans would not necessarily be systematic. They would still have to develop their own crop rotations and determine what parts of the farm needed soil improvement. It is this phase of the soil-conservation problem which needs most attention. Without proper planning, soil-improvement activities may be concentrated on one part of the farm while the remainder is allowed to deteriorate.

Systematic crop rotation in itself does not guarantee soil improvement. The rotation may be of such length that the soil-building phase does not reach all parts of the farm for several years. As an example, in a three-field rotation system including corn, small grain and alfalfa, where each alfalfa seeding is left from 3 to 5 years, it would be from 7 to 11 years before the entire farm had been seeded to alfalfa just once. Even in this rotation, effective soil building might be accomplished by seeding clover in the small grain and plowing it under after the grain is harvested. The costs of this type of soil building would be the purchase of clover seed and the cost for additional seed-bed preparation if such is necessary. A green-manure crop of this type can be plowed under either late in the fall or just before the seed-bed preparation the following spring. Green-manure crops other than sweet clover are seldom used by clients in the county. A popular rotation which contributes to soil conservation in this area, includes an intertilled crop (usually corn), a small-grain crop, and a hay crop such as red or alsike clover.

12/ In 1938 compliance was 61 percent for Region II (Minn., Wis., and Mich.) according to a Summary of Rural Rehabilitation Supervisors' Reports, Farm Security Administration (unpublished).

To Provide Adequate Pasture

Adequate pasture in Stearns County is frequently as neglected as high-quality roughage. The temptation is great for tenants to overstock their permanent pasture, because cash rent is a fixed amount regardless of the number of livestock kept. Native pastures provide good forage during the spring and early summer months. Usually by mid-July pastures become dry, and little forage is available until rains start in the fall. There is general need for rotation pasture to supplement native pasture during the dry semi-dormant period in midsummer. Good rotation pasture, including a variety of grasses, would help maintain a steady volume of pasturage throughout the season. Rotation pasture would be needed on some farms if the dairy enterprise were adjusted from fall to spring freshening.

Types of tame-pasture grasses adapted to the area include the clovers (red, sweet, and alsike), alfalfa, timothy, and brome grass. Recommendations of combinations of grasses, rates of seeding, pasture management, and probable yields may be found in recent extension publications. ^{13/} For fall pasturage rye may be sowed early. Ordinarily it will also furnish pasturage in the spring, before the land is plowed for seeding other crops or it can be pastured lightly in the early spring and later harvested as grain. If the spring pasturing is not too late, the yield of rye will not be decreased.

The volume of feed produced by a crop when pastured is often underestimated. Estimates indicate that closely grazed pasture produces about two-thirds as much dry matter as the same plants would produce if they were allowed to grow nearly to maturity and then cut for hay. ^{14/} The same source indicates that the dry matter of immature grass is more digestible than the dry matter from mature grass. In fact, pasturage yields about three-fourths as much digestible nutrient as the same crop harvested for hay. When it is considered that less labor and other expense is required with pasture than with harvested crops, the place and economy of pasture in the farm organization should be easily recognized.

The pasture program on rehabilitation farms should be carefully planned. The amount of pasturage needed during a season should be estimated as accurately as possible. The existing permanent and rotation pasture on the farm should then be appraised with regard to the amount and seasonal character of forage that will be produced. Provision can then be made to supplement existing pasture where production is expected to fall below that needed. New leasing agreements, making it possible for tenants to use a part of the cropland for pasture, would contribute to the development of more adequate pasture programs.

^{13/} Crim, Ralph F., and Arny, A. C., Pasture Plants and Combinations, Minn. Univ. Agr. Ext. Div. Ext. Bul. 197, March 1939.

^{14/} Semple, A. T., and others, A Pasture Handbook, U.S. Dept. Agr. Misc. Pub. No. 194, rev. Feb. 1937.

Adequate Weed and Disease Control

Effective weed control in Stearns County is an important crop-production problem because weeds compete with crops for soil moisture that is often limited.

Quack grass is probably the most persistent and difficult weed to control and eradicate. Weed control is likely to be a more difficult problem among clients on poor farms. In planning a crop system where this is the case, careful consideration should be given to control inasmuch as more power is usually needed to clean up weedy farms. Where quack-grass infestation is severe, landlords may insist that their tenants have tractors. Field cultivators are also necessary equipment. If the farm operated by the client is severely infested, consideration should be given in the farm budget to the purchase or hire of the needed power and equipment. The importance of giving attention to this phase of crop production should not be overlooked in farm-organization and operation planning. Only disease-free seed should be selected and the rehabilitation loan should provide for materials and equipment essential to combat disease and insect pests incident to the particular crops produced.

Developing Livestock Systems

Production Problems

Among the more important problems encountered in the organization and operation of a livestock system are breeding, feeding, housing, disease control, time of production, and marketing. These problems can be discussed but briefly.

Breed improvement in all livestock enterprises would undoubtedly do much to increase the income of rehabilitation clients, but how to secure such improvement at moderate cost is the problem. In general, it is probable that rehabilitation clients are less efficient in handling higher grade livestock than other farmers. Better livestock would undoubtedly be more economical, if higher quality animals could be procured without adding unduly to operating costs and to the risk of the enterprise. The Farm Security Administration has given increasing attention to the problem of helping clients obtain good livestock.

Satisfactory sires for their dairy and hog enterprises are a major problem to FSA clients in Stearns County operating small farms. It is uneconomic for many clients to own a dairy bull, particularly with a herd of only six to nine cows. With feed production the limiting factor on the size of the dairy herd, keeping a bull means that one less milk-producing animal can be maintained. Hence, from the economic standpoint a client, on a small farm, cannot afford to own a bull. Clients have found that dependence on the service of a neighbor's bull is not always satisfactory. Often the bull cannot be obtained when needed, considerable time is consumed in transportation, or a satisfactory animal is not available. For these reasons most clients now own dairy sires even though herds are small. It has been suggested that several clients use a bull cooperatively,

a procedure which has proved satisfactory in other areas. This plan appears to be practicable only where several farms are located close together, and in Stearns County, rehabilitation farms are widely scattered. Artificial insemination is another possibility in solving the high-grade sire problem, particularly for small herds. It would probably not provide breeding services at less cost, but it would permit a faster rate of breed improvement.

The typical rehabilitation farm in Stearns County has one or two brood sows. Owning a boar for this number of sows is uneconomical, so some clients buy bred sows, thereby making it unnecessary to own a boar. This practice has several drawbacks. The purchase price of the sow is usually more than the cost of the feed necessary to raise one, and frequently animals of good breeding are not readily obtainable. Some clients endeavor to solve the service problem by purchasing a boar and selling it when no longer needed. In this way breeding service is obtained at moderate cost. Other clients borrow, or pay moderate cash sums to their neighbors, for the use of boars.

Cost of good-quality breeding stock for poultry does not present a serious problem. Some clients purchase baby chicks and this practice is undoubtedly the most economical if the client is not equipped with incubators and auxiliary equipment.

Feeding is probably the most important problem in the organization and operation of a livestock system. Feeding practices of rehabilitation clients could be greatly improved; however, this improvement must come about without the extensive use of commercial feeds. Improved feeding methods will undoubtedly result in higher returns from each of the livestock enterprises, but particularly so in the case of dairy cattle and hogs.

Rehabilitation clients rely too much on corn stover, straw, and hay as roughage for dairy cows. Corn stover and straw lack the necessary protein and minerals, and usually wild hay is also deficient in these elements. The relation between the nutritive ratio of the dairy ration and production has been discussed. It was pointed out that while feeding at the same level, a ration containing more protein, within certain limits, will result in greater milk and butterfat production. Since alfalfa and several varieties of clover can be readily grown in the area, high-quality roughage would not be difficult to obtain. The practice of feeding rations low in protein results from cropping systems which have not adequately provided for high-quality roughages.

In this area, problems in feeding, housing, timing of production, and marketing of the product are all associated in the dairy enterprise. Feeding and housing problems vary in intensity, depending on the timing of the production program (spring or fall freshening). In the case of herds which freshen in the fall most of the butterfat is produced during the winter and early spring months and the cows are dry during the summer. Under the spring freshening system, pasture is available during much of the production season.

Successful winter dairying in Stearns County is dependent on adequate housing facilities for the dairy herd. Dairy barns on some of the borrowers' farms are poorly constructed, poorly designed, or in a bad state of repair. Some barns have but single wall construction. Others have too much open space, too high a hay-mow floor or no partitioning walls. Despite the absence of good facilities, some borrowers continue to practice winter dairying. As a consequence, their production is low; under such conditions, they should shift from a fall to spring freshening program. Following the latter practice they would need less grain and roughage for the winter. Many would have to improve their pasture to secure satisfactory feed.

Winter dairying offers some advantages over summer dairying. It has the advantage, though it is not so important as first appears, of shifting a part of the labor load from the busy crop season to the winter months. The peak labor load for the crop enterprise occurs between June 15 and July 30. Corn cultivating is not completed until about July 15, the first cutting of tame hay occurs from June 15 to June 25, and native hay is harvested from July 1 to July 15. Grain harvest extends from about July 10 to July 30. The later date is usually the beginning of the dry period for cows which freshened during the previous fall. Ordinarily by August the peak of the labor load connected with crops has passed, therefore, it appears that winter dairying does not help greatly in the better seasonal distribution of labor.

Another advantage claimed for fall freshening is the effect of new pasture on milk production. However, many borrowers report this effect is of short duration.

To estimate the probable difference in returns from winter and summer dairying, monthly average butterfat prices paid to farmers in Stearns County for the 5 years, 1934-38, were used. ^{15/} Monthly production based on a normal lactation curve for a cow producing 180 pounds of butterfat during a 10-month period was calculated. ^{16/} Estimated production by months for a cow freshening in the fall and for one freshening in the spring is shown in figure 2. This chart also contains the monthly butterfat price curve. For each system of dairying, the monthly production was multiplied by the average monthly price to give the estimated value of product by months. The monthly value of the production is presented in graphic form in figure 3. The monthly value of product was totaled for each system of dairying, giving total value of product of a cow freshening in October as \$55 while that of a cow freshening in April was \$53. The difference is not significant.

Based on these calculations it is believed that rehabilitation borrowers should consider carefully their particular situations before deciding the season of the year in which their cows should freshen. With the herd

^{15/} From unpublished data collected by Dr. W. C. Waite, Division of Agricultural Economics, University of Minnesota, St. Paul, Minn.

^{16/} See Morrison, F. B., Feeds and Feeding, ed. 20, 1939, p. 515, for a discussion of the effect of advancing lactation on yield of milk.

RELATIONSHIP BETWEEN THE MONTHLY BUTTERFAT PRICE AND ESTIMATED MONTHLY PRODUCTION OF A COW PRODUCING 180 POUNDS OF BUTTERFAT ANNUALLY (FALL VS. SPRING FRESHENING)

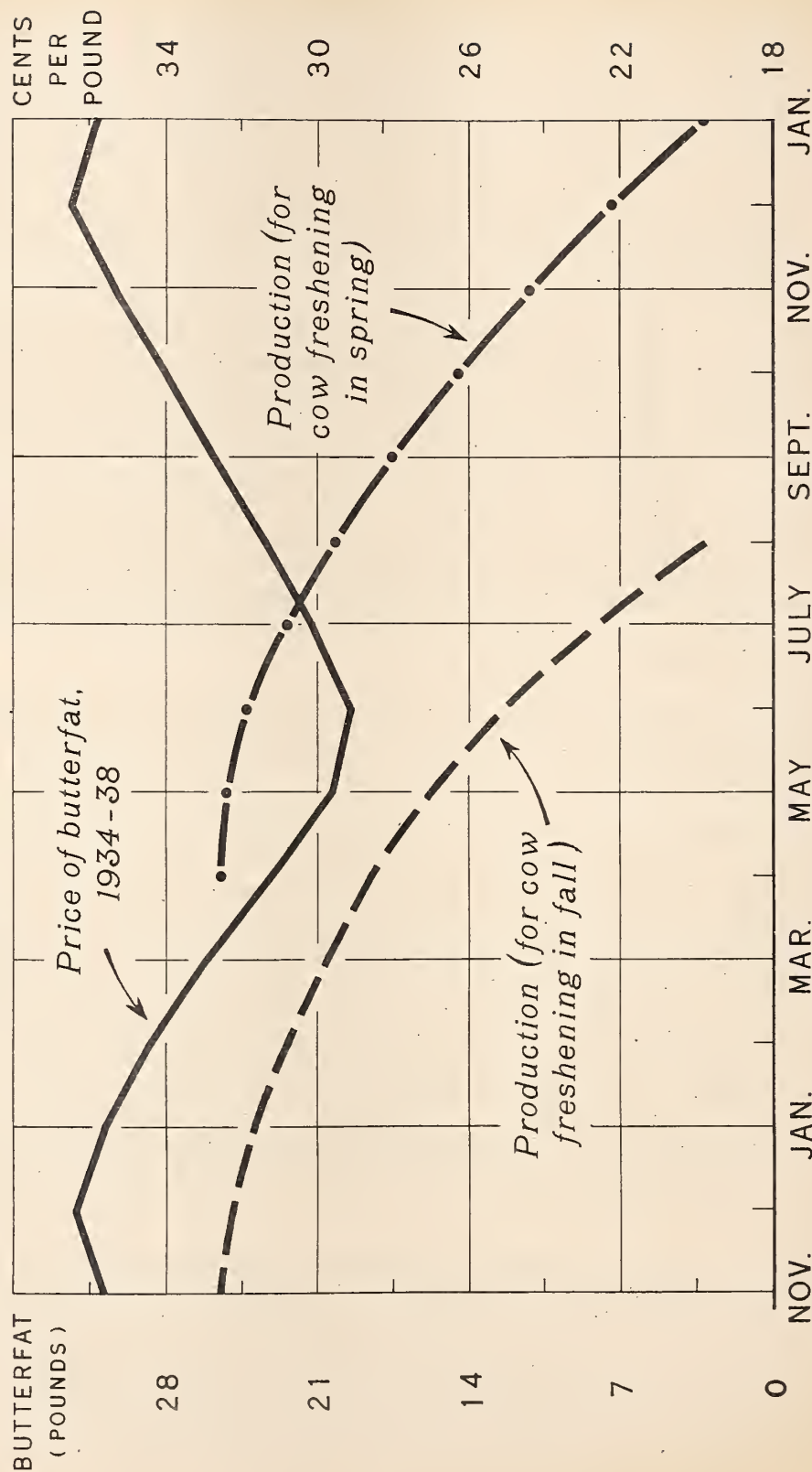
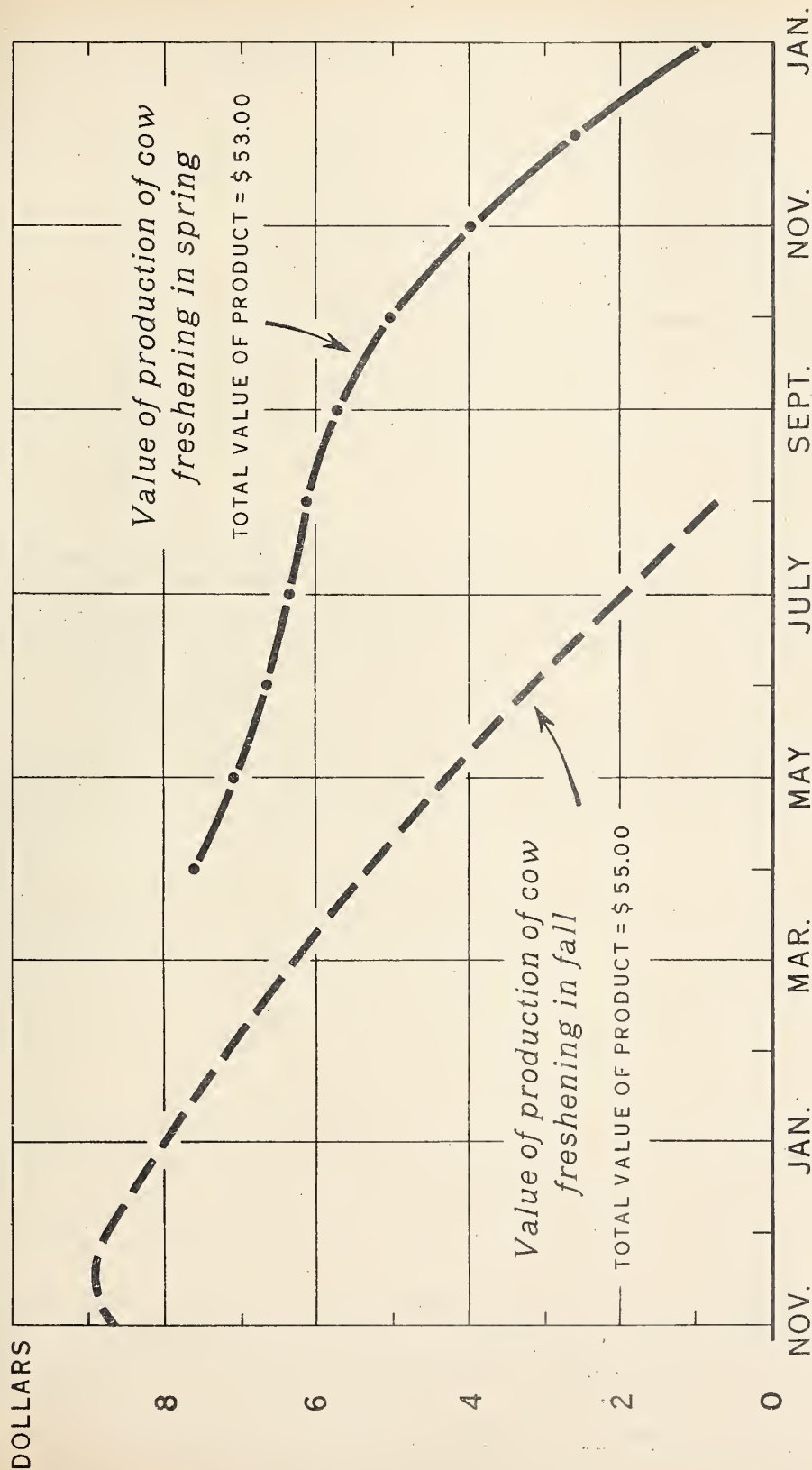


FIGURE 2

ESTIMATED MONTHLY VALUE OF PRODUCTION OF A COW PRODUCING 180 POUNDS OF BUTTERFAT ANNUALLY* (FALL VS. SPRING FRESHENING)



* BASED ON MONTHLY AVERAGE BUTTERFAT PRICE, STEARNS COUNTY, 1934-38

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FIGURE 3

freshening in the spring, much less provision is required for the growing, harvesting, and storing of hay and concentrates, less labor is involved, there is less need for good buildings, and incidental costs are lower. Because costs of production are less, the total net returns in most instances would probably be greater in the case of spring freshening. On farms where the latter practice would be the more profitable, greater attention would need to be directed toward pasture improvement.

A well-integrated livestock system is one which makes an efficient use of all crop and animal byproducts available on the farm. Skim milk is a byproduct of butterfat production in Stearns County where the milk is separated on the farm and the butterfat is sold to creameries. There is no available market for skim milk and inasmuch as skim milk is an excellent supplement to the grain rations for hogs and poultry, it should be used to take the place of a part of the grains. By its use the animal will be able to make more efficient use of the other feeds in the ration.^{17/} Most dairy farms can well afford to keep a few hogs or poultry to consume the surplus skim milk under these circumstances.

The control of livestock diseases is an important production problem for FSA clients as well as for all farmers in Stearns County. Probably the most serious disease from the standpoint of its consequences among dairy cattle is contagious abortion (Bang's disease). This disease may be introduced into herds by purchased animals that are infected, by using a neighbor's infected bull, or by the infection being present on the farm. Farmers sometimes have to dispose of their entire herds. To start in again with disease-free animals is very costly, to say nothing of the loss of time and income during the rebuilding period. This disease can be the cause of severe financial distress and can affect the health of the farm family.

Three positive courses of action will aid in the prevention of contagious abortion. One is careful inspection and testing of animals before purchase. The transport of animals infected with the disease is forbidden by law in some States, but similar protection to the buyer is not provided within State boundaries. It should be a requirement that FSA clients, either at their own expense or at the expense of the seller, have all cattle tested for this disease before they are purchased and before they are brought to the farm. The expense would be slight compared to the insurance value in disease prevention. A second course which should be followed is to keep stray livestock off the farm by maintaining line fences and gates in good condition. Care should also be taken not to use sires which are infected or that may carry the disease from infected herds. Finally, the premises should be kept clean and free of litter and animal refuse.

Hog cholera has not been an important disease problem on rehabilitation farms in Stearns County during recent years, but sporadic outbreaks of the disease have occurred. The cost of vaccination is small compared to the losses which may result. In some localities there appears to be

^{17/} For the discussion of the feeding value of milk see Morrison, F. E., Feeds and Feeding, ed. 20, pp. 585, 596, 605, 609, and 874, and appendix table I.

considerable community feeling against vaccination, some believing that it spreads the disease. This was a common thought on the farms surveyed. In areas where hogs are more numerous, vaccination is probably more generally accepted as necessary to the successful conduct of the hog enterprise.

Hogs are subject to other disease hazards in this area, probably the more important being internal parasites and mange. Both of these can be effectively controlled by keeping the hog yards and buildings clean. The provision of clean pasture for young pigs is also important.

Encephalomyelitis (sleeping sickness) is a disease which has destroyed the work stock on several rehabilitation farms. Because of losses from this disease some borrowers have had to request supplementary rehabilitation loans. The effectiveness of vaccination for the prevention of this disease is somewhat questionable, though some clients have availed themselves of this preventative measure and all of them have been urged to do so.

Regular and systematic programs for the control of livestock diseases should become an integral part of farm-operation planning. The lack of progress in the rehabilitation of some clients has been due to losses from disease, and certainly the mortgage security of rehabilitation loans is more effectively protected when positive measures for disease prevention are in force.

Provision for Adequate Replacement of Stock

One of the prime requisites of a good livestock system is the timely provision for the replacement of breeding animals which lose their productivity through age, disease, or accidents. Especially important in this respect is the dairy enterprise, for two or three years are required to raise a replacement animal. In the beginning of the rehabilitation program not enough attention was given to this phase of farm planning. Some clients needed more replacements than had been anticipated and, as a consequence, had to purchase replacement breeding stock, making it necessary to receive supplementary loans. ^{18/} Clients who had failed to raise replacement heifers, or who had sold them and did not have the cash to buy others, saw their dairy herds dwindle. When the FSA clients found their incomes lower than had been expected, there was a temptation to sell their young stock and postpone provision for replacements. Some borrowers were too optimistic about the productive life of the cows. Others failed to use their loans in the purchasing of heifers to take care of their needs until they could raise the necessary replacements.

When a farm business is expected to function continuously for at least a 5-year period, provision should be made in the farm plans for maintaining an adequate number of productive livestock. This problem should be faced when the rehabilitation loan is granted; the probable number of replacements and the time at which they will be needed are parts

^{18/} See Bailey, Warren R., Rural Rehabilitation Progress in Stearns County, Minnesota, U. S. Dept. Agr., Bur. Agr. Econ., Farm Mgt. Rpt. 3, pp. 8-10, March 1940 (processed).

of the problem. Plans should be initiated immediately to provide for these needs. The best age distribution of cows in the dairy herd is probably that which requires an equal number of replacements each year. The replacement of a considerable portion of the herd at one time tends to be disrupting and may seriously affect the income from the farm. In cases where the dairy herd is being increased from the proceeds of the loan, animals that will give a normal age distribution should be bought. In cases where the herd is not being increased, it may be necessary to provide in the loan for replacements essential to the present herd.

Unsatisfactory Tenure Arrangements

In Stearns County and in the surrounding territory, insecurity of tenure is recognized by both the Farm- and Home-Management supervisors as the most serious problem interfering with rehabilitation of clients who are renting farms.

The importance of security of tenure was recognized early in the rural rehabilitation program. Without security, a borrower is prevented from taking many steps necessary to the efficient organization of his business. His plans must be based on a year's operations -- often to his disadvantage. If he engages in special enterprises, his organization and equipment would probably be out of gear when he moved to another farm. Insecurity of tenure makes a farm operator plan his organization in accordance with the normal organization in the community, as by so doing he can more readily adjust to his next farm.

Security of tenure does not necessarily imply long leases. Young operators want the opportunity to move to a larger farm unit as their family labor supply and capital resources increase. Two factors which would contribute to more satisfactory tenure arrangements are compensation for disturbance and compensation for the unexhausted value of nonmovable improvements. Failure by either party, landlord or tenant, to give advance notice of a desire to terminate a lease should involve a penalty. After the termination of a lease, the tenant needs time to find another farm and the landlord needs time to find a tenant. If either party fails to give notice in advance, he should be willing to pay something for his release from the contract. Such payment or penalty would at least partially offset the inconvenience and economic loss to the other party.

Other than for disturbance, compensation should also be given the tenant-operator for the unexhausted value of nonmovable improvements, such as cross fences, repairs on buildings, applications of lime or fertilizer, and seedings of alfalfa. To determine the unexhausted value of an improvement, its normal life should be estimated and the compensation based on the fraction remaining. Thus far, these ideas for compensation have not been accepted to any extent in Stearns County. Many landlords wish to sell their farm rather than hold it for investment purposes. Naturally they have little interest in the future productivity of the land and do not attempt to maintain the improvements. To them, the cost of making needed repairs and improvements would often be greater than the value added to the real estate. In view of this situation, it can be readily understood why the Farm Security Administration has had limited

success in its campaign for more satisfactory farm leases. Written contracts in many instances have replaced oral agreements, and the flexible farm lease, with modifications, is in use on some farms. Still, most borrowers have only a 1-year lease and are looking for other farms each fall.

The problem of satisfactory leases emerges whenever the FSA supervisor makes farm-organization plans. A need for adjustment may be obvious to both the borrower and the supervisor, but the uncertainty of the borrower's tenure prevents the necessary steps being taken to improve the farm organization. The farm lease is one of the more important factors in the framework within which farm plans must be made. Term of tenure is just as much a part of the client's recourse as land, livestock, and equipment, even though it may be an unsatisfactory part.

Short-term leases without provision for payment for the unexhausted value of improvements or for disturbance create problems in production plans, and the accompanying frequent moving from farm to farm involves no small cost to the tenant. In Stearns County, it has been estimated by the County Supervisor that each move costs about \$200. This is partly actual cash, though part consists of lost time and the difficulty of becoming acquainted with the new farm, and its soil, productivity, buildings, etc. One of the more common reasons clients have for moving is to get a farm with better buildings, and, since good buildings are very important in the winter, many clients move in the fall. This means that they must transport large inventories of hay, grain, seed, and supplies, with time and labor thus consumed unavailable for more productive uses.

There are a number of methods by which leasing arrangements might be improved. Participation by the County Supervisor in drawing up the lease would probably add to the client's bargaining power and might permit him to secure more favorable terms. In general, competition among tenants for farms is intense, and in many cases rents are higher than they otherwise would be. As a result tenants must accept lower standards of living or retire their indebtedness more slowly.

As in other areas rental rates are determined largely by custom. For example, the landlord customarily receives one-third of the small grain if the tenant assumes all expenses, regardless of the fertility of the soil. Crop production expenses differ little, but the tenant's return per acre is much larger on fertile than on infertile soil. Some farms are well equipped with buildings and fences, and the tenants can keep livestock through which to market their crops, and thus increase their income. Considering the rundown condition of some farms, rental rates are too high and restrict the progress of rehabilitation.

This discussion raises the question of how much rent farm units can pay. What are the characteristics of farm units affecting their ability to pay rent? As a result of their recent study of this problem, Rawlings and Johnson conclude that productivity (per acre) and size of

farm unit are important factors limiting rent-paying ability. ^{19/} In general, customary rentals are proportionately higher on small and lower on large farms. The same tendency prevails with respect to productivity. Rentals on farms of low productivity are relatively higher than on farms of high productivity. In general, for each type of farm organization and size of family, there is a minimum size of farm unit, at each level of land productivity, which can pay a gross rent ^{20/}, and on which the farm family can secure a minimum standard of living essential to health and decency, and the operator can maintain his capital. Families located on units below this minimum (a combination of productivity and size) cannot for long continue to pay a gross rent, without diminishing their capital or imperiling their health, unless they receive supplemental income off the farm.

On the other hand, the landlord usually will endeavor to lease his property for a gross rent sufficient to cover his "necessary expense" which includes taxes on land, taxes and upkeep on improvements, depreciation, some return on his invested capital, and an allowance for his share of the management. Small or unproductive farm units are uneconomic for both tenant and landlord.

If the rental on a particular farm appears excessively high to the FSA supervisor, one method of securing an adjustment may be to present the landlord with a carefully prepared farm budget showing the necessary family and farm operating expenses and the probable receipts. This should be the first step in reaching an agreement as to an equitable distribution of the farm income.

The fact that tenants moved from one farm to another means that either tenant or landlord was dissatisfied and further that no successful attempt was made to come to an agreement. The organization of a board of arbitration to hear cases of landlord-tenant disputes should facilitate working agreements and should help to reduce the frequency of moves by tenants. An example of the procedure which might be followed in arbitration is that recommended by the Farm Tenancy Committee, Iowa State Planning Board. ^{21/} Two methods are suggested by this committee. Under one, a number of qualified arbitrators would be certified for each county and supplied with information relating to prices, methods of valuation, and legal matters. Under the second method, county arbitration boards would be established. Under each plan, arbitration facilities would be available but not compulsory. Only matters of fact would be heard, and except where the sums were large the decision of the board would be final. In order to make the facilities of such a board available to all, it should be voluntary, and operate at no cost to either tenant or landlord. It might be feasible to have the expenses of the board paid from public funds.

^{19/} Rawlings, Brown R., Jr., and Johnson, O. R., Relationship of Productivity of Farm Units and Their Ability to Pay Rent, Mo. Agr. Expt. Sta., Res. Bul. 308, Nov. 1939.

^{20/} As employed here, gross rent is the remainder after family living expense and the operating costs have been deducted from the value of production.

^{21/} Iowa State Planning Board, Farm Tenancy Committee. Report and Recommendations, pp. 37-38, Des Moines, Ia., Oct. 1938.

Although not its policy, the Farm Security Administration can make loans for paying rent in advance. If this were done, a 5-year leasing contract could often be secured. The FSA has not made loans for this purpose, because the client might become discouraged and quit before the end of the 5 years, in which case the FSA would have to locate another tenant. Considering the number of individuals seeking farms, however, this would not be difficult.

A plan whereby the FSA could negotiate with large institutional landholders for farms on the basis of a 1-year contract, automatically renewable, with clauses stipulating compensation for disturbance and for the unexhausted value of improvements, is attractive. ^{22/} If a farm were sold the evicted tenant would be offered another farm owned by the institution on similar terms. Although this plan would not guarantee long-time tenure, it would offer an important element of security in that the tenant would not be permanently evicted and he would be assured of continuing his farming operations under the same terms.

Another plan for alleviating its tenure problem is being explored by the Farm Security Administration. Under this plan tenant operators in a community form a cooperative for leasing farms and farm land. The cooperative leases the property from the landowner for cash and sublets to farm operators under appropriate terms. The plan offers definite advantages over individual leasing to both tenant and landlord. The landlord has more assurance of collecting his rent because as a business firm the cooperative is more stable and has greater continuity than the individual operator. If an operator goes out of business the cooperative secures another renter. If damage to property occurs, the cooperative is responsible. Also, the plan offers such advantages to the tenant as the opportunity to obtain more satisfactory leasing arrangements, the greater bargaining power of the association in establishing rentals and the opportunity of obtaining concessions on rent payments through credit facilities of the association. As in other cooperative efforts, certain problems probably will arise which must be corrected before the plan becomes entirely satisfactory.

FITTING THE PLAN TO THE SITUATION

The supervisor of any county may have a tendency to think in terms of one or two types of farm organizations. In time these may become stereotyped. Since Stearns County is located in the southern Minnesota dairy region, it is to be expected that most farm plans would be built around the dairy enterprise. However, there are some farms where beef cattle, sheep, or hogs provide the principal source of income. While these are exceptions and are not organized like the majority of farms they probably represent the most economic adjustment to a particular set of conditions. The study of the rural rehabilitation program in Stearns

^{22/} Although these large landholders desire to sell, some of their farms are not in salable condition. The salability of these farms might be increased through well-planned and supervised farming. Other farms, though salable need not deteriorate while the holder is seeking a buyer.

County definitely indicated that farm plans cannot be cut from a single pattern. Each plan must be developed to fit the special combination of resources and circumstances. These include the farm, the capital structure, the operator, and the labor supply. In addition, there are influences outside the boundaries of the farm which affect the farm organization. These include climatic conditions, length of growing season, distance to market, type of road, and available markets. The farm plan is also affected by the availability of cooperative community services, such as buying and selling groups, cow-testing associations, and breeding cooperatives. Special markets may be available in the form of pea-canning factories, cheese factories, and milk-drying plants.

From the standpoint of the rural rehabilitation supervisor, the special abilities and limitations of the operator are vital factors to which the plan must be fitted. Is the operator more efficient in dairying or in poultry? Does he have a great capacity for getting work done, or is he better at managing small details. While information of this character is exceedingly important, it is frequently difficult to obtain and to evaluate.

Fitting the farm plan to the situation may be especially difficult when the farm, the capital resources, and the operator are brought together for the first time. Frequently, the rehabilitation applicant has just moved to the present farm. He will likely be unfamiliar with the soil (its productivity and adaptability), carrying capacity of the pasture, weed infestation, and other characteristics of the farm. If dairy cows have been purchased, their productive capacity will not be known. This lack of physical and production information is the most serious limiting factor in establishing clients on new farms. In most cases where rehabilitation is to be made, the borrower can ordinarily supply some detail on past performance even though adequate records may not be obtainable. It is recognized that adjustments are usually less difficult before the farm has become a going concern. If the farm has been organized for some time, however, the effect of recommended adjustments can be more readily estimated. The probable outcome of a new combination of resources usually involves considerable judgment.

If a rehabilitation client had the power to command unlimited resources, the farm plan could be built entirely around the man and his capabilities -- the operator would represent a fixed factor to which the other elements of production could be adjusted. But Farm Security Administration clients cannot obtain unlimited resources; they may not be able to rent the farm they want; and their resources in the way of equipment and livestock are usually very limited. Often, it is not possible to make the farm plan fit all conditions. A compromise may be necessary. In the development of farm and home plans, many elements which are not subject to variation are found.

Variations with respect to farms, capital goods, operators' managerial ability and experience, and labor supply will be discussed to depict differences found among rehabilitation clients. The PSA usually considers the operator and the family as a unit. The two are here treated as distinct elements in the farm organization, as this discussion is

primarily concerned with the farm-management aspects of rehabilitation. From the standpoint of welfare, the FSA has rightly thought in terms of the family.

The Farm

Farms operated by rehabilitation clients vary considerably in size, area of cropland, proportion of tillable and nontillable land, productivity of cropland, productivity of pasture and hay land, character and adequacy of farm buildings and fences, and presence or absence of legume-hay seedings. In one sense, all of these characteristics that apply to the land itself can be translated into farm size or crop production. Farms small in area but containing a high proportion of cropland of high productivity may be as large from the standpoint of crop production as farms with a greater acreage of cropland of low productivity. Crop production is the fundamental source of farm income, whether the crops are sold directly or fed to livestock and marketed as butterfat, cattle, hogs, or poultry and eggs. Variation in size of rehabilitation farms is shown in table 7.

Table 7.- Frequency distribution of 48 rehabilitation farms according to size and proportion of farm in cropland, 1938

Percentage of farm in cropland :	Size of farm - acres					
	0-89 :	90-129 :	130-169 :	170-209 :	210 and over :	All farms
	Number	Number	Number	Number	Number	Number
0 - 29 :	-	-	2	-	-	2
30 - 49 :	3	2	5	5	1	16
50 - 69 :	3	8	4	7	2	24
70 - 89 :	-	3	-	-	1	4
90 -100 :	-	1	1	-	-	2
All farms :	6	14	12	12	4	48

In 1938, of 48 farms returning complete account records, there were 6 farms of 89 acres or less, 14 farms from 90 to 129 acres, 12 from 130 to 169 acres, 12 from 170 to 200 acres, and 4 over 210 acres in size. But size of farm is a relative matter. Rehabilitation client farms are large or small depending on the size of the family which must be supported. Farms are small when the total acreage, the harvested crop acreage, and the labor requirements are small. Problems of farm planning are usually more intense on the small farms. On them, it may be difficult for the client and the county supervisor to develop a farm business of sufficient size to provide a satisfactory income. On the small farm unit, no matter how efficiently operated, the FSA borrower may fail in complete rehabilitation. Increasing the size of the business on 60, 80, and 120-acre farms has been an important problem in Stearns County.

On farms which are small in respect to potential crop production, an increase in the size of business may be accomplished by several means: intensive cash crops that require larger amounts of labor and that will produce a larger gross income per acre may be introduced. Feed crops may be fed to livestock, making a more effective use of available labor. The dairy enterprise requires a fairly intensive use of labor. In considering the production of intensive cash crops it must be recognized that markets are rather limited. A few clients are growing potatoes, canning peas, and tobacco. Early in the rehabilitation program in this county, large poultry enterprises were encouraged in order to augment the family earnings. The results, however, were rather disappointing, probably because of the managerial and technical skill required. This is undoubtedly true with other enterprises, and caution should be exercised before recommending new crop or livestock ventures.

Land or soil improvement is another method of increasing the productive size of small farms. In Stearns County, an inquiry into this possibility revealed that virtually all of the tillable land had been plowed. It would be possible to increase the productivity of the pasture on some farms by seeding marshy areas to reed canary grass (*phalaris*). Increasing soil fertility through carefully planned crop rotations and application of barnyard manure is effective in this as in most areas. Clearing brushy land does not in general appear economically feasible on most farms. It must not be overlooked that land clearing or soil improvement is often a slow and laborious process, and, for those clients who are tenant-operators, it is not ordinarily feasible.

It has been assumed in this discussion that if rehabilitation clients are located on small or unproductive farms, the situation must be accepted and the best possible adjustment made of it. In Stearns County, it has been difficult for clients to rent additional land or more productive farms, although some have made progress in that direction. It has been the belief that as soon as clients could accumulate more capital goods, they would be able to compete more successfully with other operators for better farms, or for more land. Where the client's farm is small or unproductive and the introduction of more intensive cash crops or livestock enterprises is not economically feasible, the only alternative, if complete rehabilitation is to be achieved, is to help the client obtain a more suitable farm.

The rehabilitation problem in this area, as revealed by data on farm size, is not confined to farms of small acreage. Planning problems are present on small and large farms, although the problems may be more difficult on farms of limited productivity. Problems encountered on large farms are primarily concerned with the amount of cash outlay required. Large farms usually require greater investment in power, machinery, and livestock for the complete and efficient utilization of the land resource. Where the FSA has to furnish a large part of this working capital, the loan is likely to become rather large. Risks to both the client and the FSA are increased as operating expenses are usually higher on the larger farms. It is the fixed charges in the operation of large farms that make careful planning and management so essential.

It should be pointed out that rehabilitation farms also exhibit wide variations in the productivity of cropland as shown by the agricultural conservation program productivity indexes in table 8.

Table 8.- Frequency distribution of farms according to relative productivity and according to size, 1938

Size of farms	Ratio of productivity to county average							
	Under 85 percent		85 - 104 percent		105 percent and over		All cases	
Acres	No.	Av. prod.	No.	Av. prod.	No.	Av. prod.	No.	Av. prod.
Under 89	1	80	3	95	1	106	6	94
90 - 129	5	77	3	97	1	111	14	91
130 - 169	6	74	4	94	2	109	12	87
170 - 209	4	80	7	90	1	109	12	88
210 and over	-	-	4	94	-	-	4	94
Total	16	77	26	94	5	109	48	90

Among the farms studied, the productivity rating of about one-third was less than 85 percent, slightly more than one-half had a rating between 85 percent and 104 percent, and the balance had a rating of over 105 percent of the county average. There appears to be no tendency for large farms to be of lower productivity than small farms. Rehabilitation farms have a productivity rating about 10 percent below the county average.

In addition to size, table 7 shows the distribution of rehabilitation farms according to percent of area in cropland. On about two-fifths of these farms less than 50 percent of the area is cropland, one-half have from 50 to 69 percent of the farm in crops, and the balance have over 70 percent in cropland. A low proportion of cropland is not directly associated with large farms. Rehabilitation farms average 54 percent cropland, compared to 59 percent for all farms in the county. The difference is probably not statistically significant, owing to the small number of farms in the sample.

What is the implication of this variation of cropland in farm planning? Primarily, it enters into the planning problem to the extent that it determines the proportions of pasture, roughage, and concentrates which can be produced on the farm. Where all of the crops are to be fed to livestock the following considerations are important. When the acreage of permanent pasture is small, provision for supplementary rotation pasture on the crop area must be made. When the acreage of permanent pasture is high, either the livestock system can be adjusted to it, or livestock from neighboring farms can be taken in for pasturing. When the acreage of permanent (meadow) hay is too high or too low, similar

adjustments in livestock must be made. Some rehabilitation clients, who operate farms having a high proportion of permanent pasture, and little cropland, have adjusted their dairy production to coincide with the pasture season. That is, they have arranged for their herd to freshen in the spring and their cows to be dry during a part of the winter so that smaller amounts of grain and other concentrates are required. Another way in which large amounts of permanent pasture can be used on the dairy farm is to raise a larger proportion of calf crop. In general, calves from dairy herds are not acceptable in the feed lot. Hence, the usual procedure is to sell bull calves as veal and to keep heifer calves as herd replacements. Because the herds of rehabilitation clients usually do not have a reputation for high production, there is little opportunity to sell young stock for breeding purposes.

Much of the native hay in Stearns County is of low quality, and, because of its relatively low protein content ^{23/}, it is not the best type of roughage for dairy cows. Where the acreage of native hay is large, its most economic utilization may be in a beef cattle or sheep enterprise rather than for dairy production. This is particularly true on the larger farms. The breeding stock of either beef cattle or sheep can be carried through the winter almost entirely on prairie hay with a small supplement of grain. In general, however, beef cattle cannot compete with dairy cows for the use of the land on small farms, though on large farms, when the competing enterprises may be combinations of cash grain and dairy, beef cattle may be in a strong competitive position. A small sheep enterprise is also a possibility on large farms having a large proportion of non-tillable land.

Dual-purpose cattle may offer some advantages for borrowers who have larger than average farms and who can operate on a more extensive basis. The milking Shorthorns and Red Polled breeds have been developed for greater milk production and can still be marketed advantageously for beef. In contrast to the usual vealing of the excess of the calf crop from dairy herds, the calf crop of dual-purpose cattle could be fed out and marketed as beef, an alternative not available to the farmer with dairy breeds. When butterfat prices are high compared to beef prices, the cows can be milked and the calves hand-raised. The hand-raised calves could then be sold as veal or marketed as feeder calves. ^{24/} It must be kept in mind that beef cattle, dual-purpose cattle, and sheep can find an economic place only on the larger farms where there is an excess of roughage or grain.

Rehabilitation farms also vary in adequacy of buildings and fences. No direct comparison has been made with respect to buildings on these farms or other farms in the area. It is believed, however, that rehabilitation farms have poorer buildings. Only two out of five rehabilitation

^{23/} For the comparative feeding value of various roughages, see table 6, page 22.

^{24/} For a discussion of the place of dual-purpose cattle in Minnesota agriculture, see Peters, W. H., and others, Dual Purpose Cattle, Minn. Agr. Col. Ext. Bul. 203, June 1939.

farms have hog houses. On farms which do not have a hog house, space must be reserved in other buildings if hogs are to be raised. The absence of a hog house does not exclude the enterprise from the farm organization, but it does present the problem of providing suitable housing space. Dairy barns on some of the farms are inadequate.

Character and type of buildings affect the way in which the farm business can be organized and operated. In Stearns County, substantial buildings are necessary because of the long and severe winters. Efficient production at a high level is impossible without proper housing facilities. Some clients have not realized this and have not made the necessary adjustments. It might have been possible in some cases for them to repair buildings, at little cash cost, or, if additional space is needed, to build a straw shed. Altering existing buildings or erecting new ones is likely to be difficult or impossible for FSA clients, particularly in the case of clients who are tenant-operators. Instead they may have to adjust their livestock systems so that good buildings are of less importance. In the dairy enterprise, this means spring instead of fall freshening, and, with hogs, the sows will have to be bred for late farrowing.

Adequacy of fences also varies from farm to farm. If fences are poor or lacking, members of the family spend much of their time keeping cattle out of the growing crops. The practicability of the FSA client making an investment for fencing materials on rented farms should be investigated. In certain instances the investment would be recovered rapidly, especially where the fence was badly needed and the cost was small.

In the discussion concerning the variation among rehabilitation farms the relatively fixed elements in the resources making up the farm have been pointed out. It has been assumed that in general the size or character of the farm cannot be changed. Some of the possible adjustments or adaptations of particular farm organizations have been suggested. As has been pointed out, in the majority of the cases, it is unlikely that tenant-operators can economically institute changes. Greater efforts on the part of the FSA to obtain the cooperation of landlords in improving their farms would probably be fruitful. In the case of farm owners, the FSA can encourage the making of changes to adapt the farm organization to unfavorable conditions.

The Client's Capital Resources

The FSA can and does endeavor to improve the availability and use of capital resources. Although the farm, the client, and the family have to be taken as they are, the FSA can help to obtain more satisfactory livestock and equipment. In fact in almost every case, it is necessary to help the client purchase livestock, farm machinery, seed, or feed, at the time the loan is made. At that time, some choice can be exercised in the selection and proper combination of capital resources.

The general objective in supplementing a client's capital resources is to procure the kinds and quantities of resources which will best fit

the resources he already owns, his ability as a farm operator, and the labor supply. The problem divides itself into two parts; the question of what resources the operator needs most and what grade or quality of resources he should have. Under the first, how many more dairy cows, brood sows, or poultry should the borrower have?

Under the second, should he have purebred or grade animals? The answer can be determined by available feed supplies and proposed organization. The answer lies in the operator's ability and efficiency. It is believed that for each level of managerial ability there is a grade of the resource with which the operator can maximize his net return. The quality of livestock on many rehabilitation farms is very low, and the efforts of the client would undoubtedly be more effective if he had better and more productive livestock.

The problem of supplementing the borrower's resources has not been a pressing one in Stearns County; however, there have been instances where more satisfactory results might have been secured had the borrower received greater assistance in purchasing capital goods. The usual procedure has been for the borrower to buy such resources as he and the county supervisor had decided are needed. The FSA borrower, usually having had recent unhappy credit experiences, is inclined to keep his loan small by buying the cheapest livestock or equipment that he can find. For this reason, some clients have made bad bargains in buying horses and cows. The result has been that they have to make replacements a year or two later. In the purchase of dairy cows or work stock, the number of productive years per unit, rather than the price alone, should be the consideration.

Nearly all the clients have supplied their machinery and equipment needs most economically by purchases at farm-auction sales, thus keeping their loans smaller. Machinery from this source can be repaired when necessary by the operator.

Another phase of the problem of supplementing the client's resources that should have more consideration is that of improving the facilities on the farm itself. Some farmers lack adequate fences or small buildings such as poultry brooder houses. Tenant borrowers complain that landlords will not even furnish material for badly needed repairs to buildings or fences. Poor facilities may exclude from the farm organization an otherwise profitable enterprise. Proper facilities are often as important to the success of a livestock enterprise as the quality of the livestock itself; yet the tenant-operator does not feel justified in improving a farm he may soon have to leave.

Funds used to provide temporary or movable equipment might contribute as much to the successful rehabilitation of the family as the purchase of livestock and machinery. Movable hog and poultry houses may be bought on the market at moderate costs, or may be built by borrowers who have some skill in carpentry. At the termination of the lease, the tenant-operator can take the movable buildings to another farm. A few borrowers in Stearns County, and possibly in other areas, need grain-storage space. Movable steel grain bins may be the solution to this problem. On the farms which lack cross-fences, it may be feasible to

arrange with the farm owner for the client to buy fencing materials, and either substitute the purchase for rent or take the materials with him if he moves to another farm.

The Farm Operator, His Ability and Experience

Farm planning must also be adapted to the farm operator. Rehabilitation borrowers differ widely in their experience and background. Clients differ in managerial ability; some have a large capacity for getting work done but lack full efficiency, while others do not have great capacity but are efficient in the use of their time. If the client's general level of efficiency and ability is low, he should not be expected to be efficient in enterprises requiring high degrees of skill, or to be able to operate common enterprises at a high level of production. Unusual enterprises may not require special managerial skill in production, but will require special connections in marketing. A farm-reared-and-trained operator will probably have sufficient ability to manage the more common farm enterprises at a moderate rate of efficiency. He will be less familiar with the unusual type of enterprise, and should not be expected to reach a high level of efficiency in those undertakings in which he lacks experience. The farm plan should, insofar as possible, include a combination of enterprises which fit the capacity and special abilities of the operator. To the extent that other members of the family assume the management of certain ventures such as poultry, the management factor does not entirely reside in the operator.

County supervisors can learn little about the special abilities of their applicants. Nevertheless, time spent in trying to determine what the borrower can do best will undoubtedly prove worth while. Farm plans for rehabilitation borrowers who have training in special enterprises could well be built around those specialties. Such plans may differ from the ordinary type of farm organization in the area, but would represent the best, taking into account the particular client's ability. In the early stages of the rehabilitation process, the borrower will probably make the most progress with a farm organization that includes the type of farming in which he is most experienced, even though that type of farming may be gradually growing less and less profitable compared with other alternatives in the area.

The Labor Supply

Another element which must be considered in farm planning is the available labor supply which in most cases is limited to available family labor. In the process of rehabilitation, planned use of the family labor supply may determine its value as an economic asset. If family labor is not utilized, the possibility of additional family earnings is foregone, while living expenses continue. In this discussion the term "available family labor" means the time and effort which the members of the family can contribute over and above that necessary for the normal functioning of the household, for education, and for reasonable play and leisure. Employment opportunities off the farm are meager in Stearns County. Sons from some of the families are working in CCC Camps, and, in certain instances, daughters are working as domestics in neighboring homes or at

other jobs in the community. Less than 5 percent of the heads of the family are working part-time off the farm.

The labor supply available on most rehabilitation farms is that of the family. It is more or less fixed in amount and must be so considered. This fixity lies not so much in the use of potential labor but rather in the fact that whether or not this labor is employed, costs of family maintenance go on. It is, therefore, to the interest of rehabilitation borrowers to employ as much of the available labor supply as will add to the net family income.

How may the farm plan be adapted to the family labor supply? What combination of enterprises should make up the organization in various family labor situations? These are the problems which face the county supervisor. Obviously any given labor supply is abundant or scarce depending on size of farm, cropping area, and type of farming. In the case of a large family and a small farm, a usual situation, the problem concerns ways of developing a production plan which will provide full and profitable employment for the family. In such a case the farm plan would call for more intensive enterprises, that is, those requiring more labor and possibly more capital.

Some of the possibilities for intensification have already been cited. In this area intensive livestock enterprises are dairy and poultry. Dairying is common to practically all farms in Stearns County, so any greater intensity in that direction may come by expanding the present dairy enterprise or by heavier feeding. Most rehabilitation clients are familiar with dairying which fits in well with the family type of labor where the most important labor-consuming job is milking -- a part-time job for a part-time labor supply.

Poultry in this area is often associated more with the household than with the farm and is mainly operated to supply the needs of the family. As a source of cash income, it has been important on but few rehabilitation farms in the county. Where poultry is a commercial enterprise, it has been most successful when active management was assumed by some member of the family other than the operator. The poultry enterprise is also well-adapted to the part-time character of family labor, and, despite the generally disappointing results in the past, its possibilities should not be overlooked where the farm is small and where there is a surplus of family labor.

At present, the more important intensive cash crops in the county are potatoes, canning peas, and tobacco. Technical requirements of tobacco culture are such that it is practically eliminated as a possibility if the farm operator lacks experience with the crop. It is limited also to certain soils. Tobacco acreage in the county appears to be declining, and the crop is the least promising of those mentioned. Potatoes are produced in the northeast portion of the county, largely for local markets. Commercial possibilities for potato production are fair. Returns per unit of labor input are not as great from a small plot of potatoes as from dairying, but potatoes will probably add to the net family income. After the dairy and other enterprises on the farm have been established, with

additional family labor available, the surplus labor could well be employed in raising a small quantity of potatoes. Canning peas do not have so high a labor requirement as tobacco and potatoes nor so high a per-acre crop value. Peas should not be grown outside the immediate vicinity of a pea sheller.

A small family on a large farm presents a problem in adjusting enterprises to the labor supply in order to secure a combination of enterprises which will employ the available labor most effectively. This problem is not often encountered in this area. Such combinations may mean supplementing the usual dairy, hog, and poultry enterprises with a more extensive type of livestock production such as beef cattle or sheep.

Full utilization of available family labor at all seasons of the year is a problem which is likely to arise in most areas. In general, cash-grain farming leaves labor unemployed during a major part of the year. However, supplementing cash-crop farming with livestock helps to distribute the labor requirements throughout the year. When contemplating changes in farm organization an endeavor should be made to avoid peak labor loads for which the family labor supply is not sufficient.

SUPERVISION OF CLIENTS

It is almost impossible to type FSA borrowers, because they vary so much from family to family. Their needs for supervision are not all alike, partly because of unlike environments, experiences, and abilities. Some borrowers of middle or advanced age started farming on little capital and have never been able to accumulate enough to operate an adequate farm business. This group has never been far out of the dependency class. Farm or industrial laborers who turned to the farm when they lost their jobs in the depression, make up another group. Still another group was composed of young farmers who, in years gone by, would have been given a start by their fathers or by the local bank.

Successful rehabilitation in Stearns County is dependent as much on personal characteristics of the operator and his family -- their initiative, ambition, courage, resourcefulness, and morale -- as it is on long farm training and experience. Successful farm operation is more than knowing how to harness a horse or milk a cow. Even those clients without long experience as farm operators had lived in rural communities, and most of them were farm-reared. Experience in Stearns County indicates that younger clients are more cooperative and accept supervision more readily than do older clients.

The FSA borrower needs supervision in his farm operations as well as assistance in making farm-organization plans. Some clients are chronically short-sighted from a business standpoint, needing help in the expenditure of their income so that cash will be available when operating expenses cannot be postponed. This short-sightedness apparently is due to the fact that the needs of the present are more urgent than those of the future. Other borrowers need help in allocating the expenditure of

their annual income so that they may get the most for their money. Sales resistance of this group appears to be low.

Through its supervision and guidance, the PSA can transmit information on better farming practices, improved crop varieties, livestock management, disease, weed control, and many things of like character. This low-income group of farmers does not appear to have been reached by the Extension Service. Few read farm papers. In Stearns County, it was found that only 4 out of 74 clients interviewed, subscribed to farm magazines. The county supervisor is the primary channel through which technical information can flow; he is the connecting link between research and the client. Frequent visits to the family make this channel the most direct and effective.

Supervision, to be most effective, must not be dictatorial. It should lead the borrower into realizing the gains to be secured by following directions and suggestions. Supervision has been variously accepted in Stearns County, by the majority of clients in a cooperative fashion and by a few somewhat grudgingly. This phase of the rehabilitation program challenges the best efforts of the supervisor.

The need for supervision will be a continuing one, in the opinion of rehabilitation supervisors. In a recent report 25/ for Region II (Minnesota, Wisconsin, and Michigan), it was estimated that nearly two-thirds of all clients who repay their loans will continue to need direction. There is no reason to believe Stearns County differs from many farming areas in this respect.

USE OF THE BUDGET PROCEDURE IN FARM PLANNING

Purpose of the Budget Procedure

Farm budgeting is a technique for planning the organization of resources at the disposal of the farm operator. As most farmers are vitally interested in increasing their income they are concerned with the most efficient use of the land with family labor supply, livestock, equipment, and other resources. The manner in which these factors are combined affects the yearly outcome of the farm business. The purpose of the budget is to aid in making advance estimates of the probable results to be obtained from different organizations of resources. Usually there is but one highest-profit combination. If several budgets are carefully worked out, the farmer can confidently choose the one most likely to maximize his returns. In other words, the farm budget is a device for thinking through the job of farm planning. The effect of a change in the farm organization can be followed through its immediate impact, and its longer-time effects.

25/ Summary of Rural Rehabilitation Supervisors' Progress Reports, Farm Security Administration, for year ending December 31, 1938 (unpublished).

Farm budget techniques have been discussed at length in a number of publications. ^{26/} The purpose here is only to indicate some of the problems of budget making in the case of a particular group of farmers and to show how farm plans as made by the FSA can be modified, or amplified, into farm budgets.

We think of a plan as a pattern to be followed. It need not be rigid or fixed. Rather, it should be considered as a guide. Events may occur making it necessary to alter the pattern, but in general, the original outline is retained. Farm plans of rehabilitation borrowers have not been plans in this sense. They have been the present or immediately past organizations projected into the future. The borrower's existing set-up was taken; if the estimated returns did not justify a loan he was given another cow, a few more hogs, or some poultry, so that these estimated returns would be adequate. Little consideration was given to the question of whether or not the borrower's farm organization made the best use of his resources.

There is no reason for not projecting the borrower's existing organization into the future if it will yield the largest net income. However, it is seldom that farmers are in perfect adjustment with their situation. This is particularly true of rehabilitation borrowers. The fact that farmers applying for rehabilitation loans have exhausted all other sources of credit suggests that if a maladjustment were not the cause of their distress, they were likely to be put out of adjustment as an immediate result of their distress. Virtually every applicant for a loan needs more power, more equipment, and more livestock.

Another characteristic of rehabilitation farm plans is that they have not included systematic crop rotations that are basic to good farming. Although the estimated production of crops would support the livestock system during the current year, it did not follow that a crop program could be arranged which would continue to supply the feed requirements of the livestock enterprise. Borrowers' plans have been 1-year plans, lacking any particular semblance of continuity.

Rehabilitation farm borrowers need two types of budgets: (1) a long-time plan of the type of farming to be followed, in other words a "normal" plan; and (2) a budget for each year to determine variations from the general plan necessary for the best conduct of the business in any particular year. By means of the long-time plan the general type of farming best suited to the operator, his family, his resources, and the farm could be set up. There would be such questions as choice of crops

^{26/} For examples of publications dealing with farm budgeting, see:

Farm Budgeting, U. S. Dept. Agr., Farmers' Bul. 1534, rev. 1938.

Pond, G. A., and Crickman, C. W., Planning Farm Organizations for the Cut-over Section of Minnesota, Minn. Agr. Expt. Sta. Bul. 295, 1933.

Pond, G. A., and Crickman, C. W., Planning Systems of Farming for the Red River Valley of Minnesota, Minn. Agr. Expt. Sta. Bul. 284, 1931.

Cleland, S. B., and Peters, F. A., Farm Planning, Minn. Univ. Agr. Ext. Div. Pamphlets 43 to 50 (incl.), Jan. 1938.

and livestock to be produced, crop rotation, and number of each type of livestock that could normally be produced. By means of the budgeting technique, the best long-time budget, or plan, would serve one other very real purpose, in the case of FSA borrowers. It would determine how large a loan, if any, the applicant could carry, and how soon the loan could be repaid.

A long-time or "normal" plan is a more realistic basis on which to make loans, than the current-year plan. If the current-year plan is made at a time when prices are relatively low, applicants may be refused loans that under normal conditions could be repaid. On the other hand, if the plans were made when prices were high, applicants might be given loans which would later cause them to become distressed.

Illustration of the Procedure in Budgeting

An actual farm in Stearns County is used to illustrate the budgeting method for improving farm organization and management when applied to FSA borrowers. It is not presented as being typical of all FSA farms in the area because no single farm would have the necessary requirements. Furthermore, adjustments needed on this farm are not needed on all farms, nor does this farm contain examples of all types of adjustments needed on other farms. It is slightly smaller in size than the average FSA farm in the county.

The farm contains 120 acres. It is on a gravel road, 12 miles from the town where poultry, eggs, and butterfat are marketed. Although a truck route passes the farm, the operator hauls his own butterfat to the town creamery. The operator is middle-aged and has farmed in the community nearly all his life. Two sons help with the farm work, the older one full-time, and the younger after school hours and during summer vacation. In addition, there are other small children. The health of the family is good.

This operator is one of the better clients in the county. He is industrious and resourceful, but somewhat slow to accept new methods. Butterfat production, the principal source of income, has been low, probably owing to lack of adequate shelter, to low-grade roughage of wild hay and corn stover, and lack of high-protein concentrates. The rate of production probably will increase somewhat because of a new barn. The operator is a skilled farmer and his farm is comparatively free from weeds, but he does not appear to be particularly efficient in the management of livestock.

The soil is a brown silty-clay loam, one of the more productive soils in the county. The cropland has an ACP productivity rating of slightly over 100 percent. The topography of the farm is level to undulating, with little evidence of gully erosion. Sheet erosion appears to have been slight. The topsoil is of good depth on most of the cropland, and while the soil is somewhat heavy, there is little difficulty with drainage.

The operator owns the farm, on which there is a mortgage. In the spring of 1936, it became necessary for him to obtain a loan from the FSA in order to buy much-needed machinery and livestock. He had sold a part of his livestock in order to supplement reduced farm income during the depression. Sales continued until he no longer had sufficient breeding stock for the farm. His machinery was in a bad state of repair. Because he could secure credit from no other source, the FSA made him a loan of about \$600. After the drought of 1936 with the resulting low income, the FSA renewed his loan and made a supplemental loan of \$100. Through June 1939 he had repaid over \$300, leaving an unpaid balance of about \$400 (not including accumulated interest).

Inventory of Resources

The first thing to be considered in a budget is an inventory of resources. The present resources of this farm are as follows:

Inventory of Resources

Real estate:	<u>Acres</u>
Total crop area	76
Tillable	53
Nontillable (native hay) ...	23
Permanent pasture	38
Farmstead, road, and waste	6
Total	<u>120</u>

Labor supply:

Operator

One grown son available at all times

One son available for morning and evening chores and summer vacation

Operator's wife for chores and care of poultry

Power and equipment:

Three work horses

All of the machinery and equipment needed for the farm, including that needed for growing potatoes

Buildings:

Barn, containing space for 20 cows, 4 horses, 3 head of young stock, a bull, and 40 tons of hay

Granary, of 2000 bushels capacity

Hog house, ample for 4 brood sows

Poultry house, sufficient for 50 hens

Machine shed, adequate for needs of the farm

Livestock:

16 head of dairy cows; 7 head of other cattle, including young stock and a bull; 4 brood sows; and 50 hens

The farm is not well-equipped with cross-fences, so that there can be no full use of crop aftermath. Fencing materials for constructing temporary fences are needed. With present buildings, the dairy, the hog, and poultry enterprises can be expanded little beyond their present size.

Prices used may be considered as normal for this area (table 9). As such, they are preferred to short-term prices for the purpose of determining the general pattern or type of farming to be followed. They must not be confused with short-term prices, which are needed when the annual budget is worked out at the beginning of the business year. Use of outlook information should be helpful in this latter purpose. In the present discussion, we are concerned only with the longer-term plan for the farm organization.

In comparing results of proposed changes in the farm organization, the normal net return from the present organization as well as that of those proposed should be estimated. When returns expected from the present organization of the farm are estimated for the longer term and compared with estimated returns from the proposed organization over a similar period, the effect of the change can be more clearly seen. An optimum organization would be the alternative which appeared to be the best among the several budgets, irrespective of the present organization. An estimate of normal returns under the present organization is helpful in the case of rehabilitation clients, as the effect of the proposed change on total returns can be indicated.

Crop and livestock data for several preceding years are helpful in appraising a client's present organization. With records for several years, it is possible to determine more closely the normal organization and manner of operation as well as the probable net return if the present situation continues. In the case of clients who have been in the program for several years, records are often quite complete; new rehabilitation cases usually have very incomplete records.

Data on the number of livestock kept for several years in the past are particularly important as the livestock enterprise may fluctuate widely from year to year owing to the ravages of disease, to variations in feed supplies, and to other causes. The usual cropping system can be determined from the acreage of the preceding year, if the client has followed a systematic crop rotation. If he has not followed such a rotation, the average acreage of various crops for several years, heavily weighted by the acreages grown in the preceding year, will help to indicate what may be considered the normal cropping system on that particular farm. Normal production of various crops can be estimated as well as the numbers of livestock that will probably be kept.

Table 9.- Assumed prices for farm products and for various expense items 1/

Item	Unit	Price
		<u>Dollars</u>
<u>Farm prices</u>		
Butterfat	Pound	0.30
Eggs	Dozen	.18
Veal calves	Pound	.07 $\frac{1}{2}$
Cull cows <u>2/</u>	do.	.03
Hogs	do.	.07
Cull sows <u>2/</u>	do.	.05
Chickens	do.	.12
Cull hens <u>2/</u>	do.	.08
Wheat	Bushel	.85
Rye	do.	.50
Potatoes	do.	.50
<u>Expense items</u>		
<u>Feed</u>		
Chick starter	Cwt.	2.50
<u>Seeds</u>		
Alsike	Pound	.20
Red clover	do.	.20
Timothy	do.	.05
Corn (hybrid)	Bushel	7.00
Alfalfa	Pound	.35
<u>Miscellaneous items</u>		
<u>Threshing</u>		
Oats and barley	Bushel	.03
Wheat and rye	do.	.05
Twine	Pound	.07
Paris green	do.	.40
Feed grinding	Cwt.	.07
Chicks	Hundred	7.00

1/ These prices are not to be taken as forecasts of prices which can be expected in the future but are derived from average prices as reported for Stearns County, Minnesota, by Minn. Agr. Expt. Sta. and the Minn. Dept. of Agriculture, Dairy and Food.

2/ Estimates based on farmers' reports.

The client frequently will have records showing amounts fed in the case of only one or two of the livestock enterprises. In these cases, the balance of the feed available must be allocated in accordance with standard feed requirements of the livestock under consideration. It may then be necessary to revise the client's first estimates of levels of feeding among the various livestock enterprises. After estimates have been made of the normal crop and livestock production and the probable amounts available for sale, the net returns which normally can be expected from the present organization can be calculated.

If the client is moving to a different farm or is just beginning a farming venture the development of the most economic farm organization can involve little consideration of past events. Instead, the problem consists of proceeding directly into making estimates of the net return from various combinations of the resources available to the client. In the case used for illustration, the farm had been in operation and the job of planning is one involving a definite reorganization.

Planning the Cropping System

One of the first problems in balancing the farm organization is the development of the cropping system. A pertinent question is whether the livestock system should be adjusted to fit the cropping system or the cropping system adjusted to fit the livestock system. In actual practice, before the final organization plan has been selected, concessions in both the crop and the livestock systems are often necessary. Crop and livestock systems must be fitted to each other, and the selection of crops for a cropping system is conditioned both by the requirements of the livestock system and by the possibility of sale of crops where market opportunities exist. To provide a continuous supply of feed crops and to maintain the productivity of the soil, a definite rotation is important and must not be overlooked.

A convenient method of setting up the acreage and production of crops under the present plan for comparison with the proposed and alternative plans is found in table 10. This example is based upon the farm resources set forth on page 49. Although at present, there is no definite crop rotation, the distribution of crops indicates a rotation of corn (1 year), small grain (3 years), and tame hay (1 year). Acreages of corn and tame hay are both too low and acreage of small grain is too high for maximum production. Normally corn produces more pounds of grain -- and corn, alfalfa, and clover produce more pounds of total digestible nutrients per acre than small grain (table 3). Furthermore, the present cropping system does not make the maximum contribution to soil building. This low acreage of intertilled crops aids in protecting the soil against erosion, however, though this is not a serious problem on the farm presented.

A good rotation for this area is one composed of a grain crop, a legume hay or pasture crop, and an intertilled crop, grown in that order. Leaving the legume crop, which is usually red or alsike clover, for only 1 year, however, makes the annual seed cost large, and borrowers are inclined to shun any action which increases their cash expenses. Then, too,

the amount of soil building which the 3-year rotation accomplishes is directly related to the amount of growth attained by the soil-building crop after the hay has been harvested and before the land is plowed for the next crop. Another popular rotation in the area is one in which one-third of the cropland is set aside for alfalfa, to be left for 3 to 5 years. To maintain soil fertility on the remaining two-thirds, sweet clover is seeded in the small grain. In most seasons the clover attains considerable size after the small grain has been harvested. It is plowed under in the fall or late spring. In either case, sweet clover is not cut for hay. Under each system of cropping there would be equal acreages of small grain and corn.

Table 10.- Normal acreage and production of crops

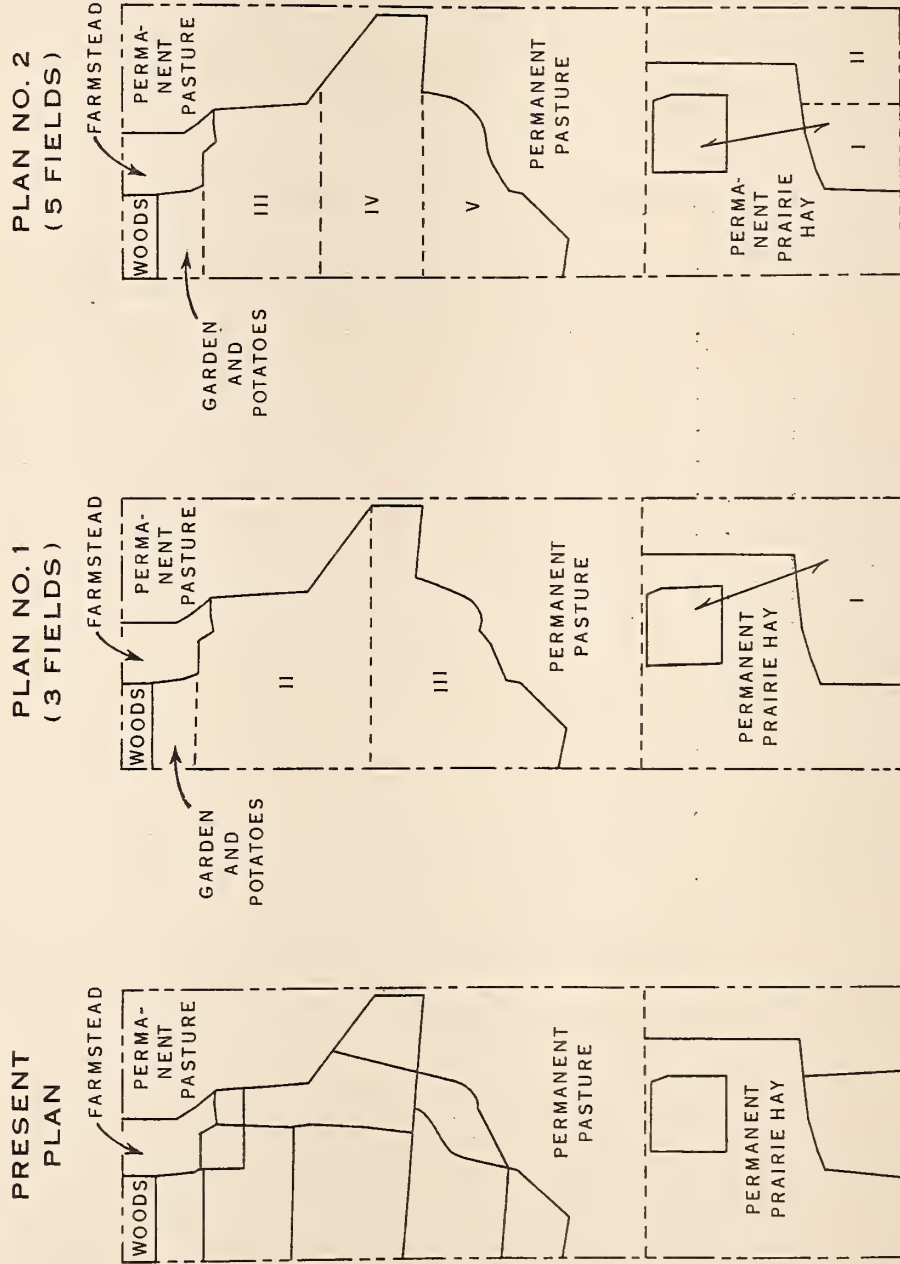
Crop	Unit	Acreage			Average yield	Production		
		Present	Plan	Plan		Present	Plan	Plan
		plan	No. 1	No. 2		plan	No. 1	No. 2
		Acres	Acres	Acres				
Winter wheat	Bu.	7			15	105		
Oats	do.	8			31	248		
Oats & barley	do.	-	13	14	30	-	390	420
Barley	do.	8			23	184		
Rye	do.	10	4	6	20	200	30	120
Corn	do.	7	17	20	28	196	476	560
Potatoes	do.	3	2	3	50	150	100	150
Alfalfa	Ton	1	17	10	2	2	34	20
Red clover	do.	8			1 $\frac{3}{4}$	12		
Sudan	do.	1			2	2		
Native hay	do.	23	23	23	1+	25	25	25
Total acreage		76	76	76				
Total grain ^{1/}	Lb.					43500	45000	53000
Total roughage								
2/	Ton					41	59	45

^{1/} After allowance for seed.

^{2/} Not including straw and corn stover.

On the farm under discussion, there are 23 acres of native hay. The large dairy herd and three horses require considerable roughage. Accordingly, two cropping systems are suggested, one including equal quantities of corn, small grain, and alfalfa, and the other 20 acres of corn, 20 acres of small grain, and 10 acres of alfalfa. Either system fits into the lay-out of the farm, though the three-field system is somewhat simpler to manipulate (fig. 4). Under the proposed cropping system the estimated production is about 45,000 pounds of concentrates and about 59 tons of roughage, compared to a present production of 43,500 pounds of concentrates and 41 tons of roughage.

FARM PLAT MAPS SHOWING THE FIELD ARRANGEMENT UNDER THE PRESENT AND PROPOSED PLANS



In the case of FSA borrowers, important yield data are frequently absent or fragmentary. An attempt was made during the course of the study to find auxiliary sources of land-productivity information which would aid in estimating crop yields. To obtain estimates of crop yields for the farm being budgeted, its ACP productivity rating was multiplied by the county average yield of the various crops as reported by the crop and livestock reporting service. It was found necessary to make some adjustments in these estimates because of specific soil differences. However, so many variables enter into crop yields that such measures of physical factors cannot be highly accurate. While estimates derived by this method are rough they must serve in the absence of more reliable data.

Planning the Livestock System

The present livestock system includes 16 head of dairy cows, 1 bull, 6 head of young stock, 50 hens, 3 horses, and 4 brood sows (producing 18 200-pound hogs) (page 50). In adjusting livestock to the new crop system, it was necessary to consider the increases of about 1,500 pounds of concentrates and about 18 tons of roughage available under the proposed plan. At present, considerable quantities of straw and corn stover are fed. It is believed desirable to plow under some of this refuse rather than feed it; therefore, the actual increase in available roughage is not so great as it appears, though additional dairy cows are needed to use the available feed. It is proposed to increase the dairy herd to 12 cows. (See table 11.)

A problem often present, which did not occur on this farm, is the lack of provision for the replacement of animals in the dairy herd. It is very important that age distribution of producing dairy cows be such that the need for replacements does not all occur in one year. If a large proportion of the herd does have to be replaced at one time, steps must be taken in advance to provide for this contingency. Independent farmers may be able to purchase replacement stock when unusual conditions arise, but FSA borrowers seldom have the necessary resources available to take care of such needs.

In planning a livestock system in this area where dairying is important, the first step is to adjust the numbers of roughage-consuming livestock to the probable normal roughage production. Then concentrates required by these animals can be estimated. This will permit adjusting the poultry and hog enterprise to the surplus of concentrates. If the hog and poultry enterprises thus planned will not consume the skim-milk byproduct, it may be desirable to increase this phase of the business and purchase concentrates so that a proper balance between grain and skim milk is obtained. Building facilities and ability of the operator in managing these enterprises must be taken into consideration.

Table 11.- Number of livestock and normal feed requirements

Kind of livestock	Number			Pounds of feed per head					
	Under	Under	Under	Under	Under	Under	Under	Under	Under
	present	plan	plan	present	plan	plan	plan	plan	plan
	plan	No. 1	No. 2	Concen-	Rough-	Concen-	Rough-	Concen-	Rough-
				trates	age	trates	age	trates	age
	Num-	Num-	Num-	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
	ber	ber	ber						
Dairy cows	16	18	16	1000	4000	1000	5000	1000	5000
Bull	1	1	1	600	5000	600	5000	600	5000
Heifers:									
Calves	3	3	3	300	700	300	700	300	700
Yearlings	3	3	3	300	2500	300	3000	300	3000
Hogs pro-									
duced (cwt)	36	36	54	450	-	450	-	475	-
Hens	50	50	50	1/7000	-	1/7000	-	1/7000	-
Horses	3	3	3	1200	4000	1200	4000	1200	4000
Total animal units of cattle and horses 2/...	22	25	22						

1/ Requirements for 100 hens.

2/ Important roughage-consuming livestock.

Tentative plans for the distribution of feed in the two proposed plans of livestock production are shown in table 12. The farm will supply the feed needed except for chick starter. No great changes in the levels of feeding are contemplated. No heavier feeding of the dairy herd is suggested until the operator demonstrates that he can manage the dairy enterprise on a more intensive plane. Even without the present handicap of poor facilities and low-quality roughage, the present dairy herd is probably incapable of high production.

One of the problems connected with balancing the proposed organization on this farm was the utilization of large quantities of skim milk. In plan No. 1 (table 12), there are 36,000 pounds of skim milk available for hogs. This amount is higher than is usually fed according to records on other farms, and some efficiency in its utilization might be lost. After the plan is in operation, it might be practical to expand the hog enterprise even though additional grain would have to be purchased.

The next question is the effect of proposed rations on the production of the dairy herd. A comparison between the present ration and that under the proposed plan, as well as the nutritive ratio, is shown in table 13.

Table 13.- Dairy cow rations ^{1/}

Feed	Present ration			Proposed ration No. 1			Proposed ration No. 2		
	: Digestible :			: Digestible :			: Digestible :		
	Pounds T.D.N. :			Pounds T.D.N. :			Pounds T.D.N. :		
	: protein :			: protein :			: protein :		
Corn	320	260	23	555	452	46	562	458	41
Oats and barley ...	680	500	68	444	328	44	438	324	44
Prairie hay	3000	1450	84	1666	805	46	2375	1147	66
Corn stover	600	218	12	-	-	-	500	182	10
Alfalfa hay	200	103	21	3333	1716	347	2125	1094	221
Clover hay	1000	496	74	-	-	-	-	-	-
Total	3027	282		3301	483		3205	382	
Nutritive ratio ...	1:10.7			1:6.8			1:8.4		

^{1/} Composition of the feeds was taken from Gullickson, T. W., and Pritch, J. B., Feeding the Dairy Herd, Minn. Agr. Expt. Sta. Bul. 218, rev. Jan. 1938.

These calculations are of assistance in estimating changes in butterfat production. The change in pounds of total digestible nutrients is insignificant, hence we are concerned only with the effect of the change in the quality of the ration. This is reflected in the pounds of digestible protein available and in the nutritive ratio. The effect of increasing the amount of digestible protein and of narrowing the nutritive ratio has been discussed. ^{27/} On the basis of information available, it is estimated that decreasing the nutritive ratio from 1:10.7 to 1:6.8 will increase butterfat production from 120 to 140 pounds per cow.

After the crop and livestock systems have been developed, the next step in the budget is the calculation of quantities of products available for sale. In Stearns County, most of the production from farms is sold in the form of stock and livestock products. A convenient method for making calculations as to quantities which can be sold is illustrated in table 14. The present and two alternative possibilities are presented. In considering table 14, it is desirable that the manner of estimating livestock production be explained.

^{27/} See table 2, page 14.

Table 14.- Production and disposition of livestock
and livestock products

Item	Unit	Number of pro- ducing animals	Produc- tion per animal	Total produc- tion	Used in the home	Used on the farm	Amount for sale
Present plan							
Butterfat	Pound	16	120	1,920	400	280	1,240
Veal calves	do.	11	166-	1,820	-	-	1,820
Cull cows	do.	3	900	2,700	-	-	2,700
Hogs	do.	18	200	3,600	400	$\frac{1}{400}$	2,800
Cull sows	do.	2	250	500	-	-	500
Broilers	do.	150	3+	500	150	-	350
Cull hens	do.	40	5	200	-	-	200
Eggs	Dozen	50	6	300	180	-	120
Plan No. 1							
Butterfat	Pound	18	140	2,500	400	310	1,790
Veal calves	do.	13	166-	2,150	-	-	2,150
Cull cows	do.	3	900	2,700	-	-	2,700
Hogs	do.	18	200	3,600	400	$\frac{1}{400}$	2,800
Cull sows	do.	2	250	500	-	-	500
Broilers	do.	150	3+	500	150	-	350
Cull hens	do.	40	5	200	-	-	200
Eggs	Dozen	50	6	300	180	-	120
Plan No. 2							
Butterfat	Pound	16	150-	2,000	400	280	1,320
Veal calves	do.	11	166-	1,820	-	-	1,820
Cull cows	do.	3	900	2,700	-	-	2,700
Hogs	do.	27	200	5,400	400	$\frac{1}{600}$	4,400
Cull sows	do.	3	250	750	-	-	750
Broilers	do.	150	3+	500	150	-	350
Cull hens	do.	40	5	200	-	-	200
Eggs	Dozen	50	6	300	180	-	120

1/ Hogs saved for brood sows.

The method of determining probable butterfat production has been discussed. Standards used for estimating production of other livestock are as follows:

Hogs - Two sows are bred for spring and one for fall farrowing; 18 pigs are raised with 2 being saved for brood sows.

Chickens - An average of 50 hens are kept, laying an average of 6 dozen eggs per hen. 300 baby chicks are bought, 220 are raised, 60 are saved for pullets, and 160 are sold or used in the home.

Dairy herd - 18 cows raise 16 calves, of which 3 are saved for replacements, and 13 are sold as veal calves. 3 cull cows are sold. The average butterfat production per cow is assumed to be 140 pounds.

These standards of production apply to the particular farm in question. They are not high and could probably be improved upon if the borrower practiced better methods of management.

The data shown under the column headed "Used in the home" were taken from the farm and home record. Where the data appeared abnormal with respect to the needs of the family, slight adjustments were made in the direction of standards supplied by the Home Management Supervisor. The above data are not intended to indicate what is necessary to meet nutrition standards, rather they are the best estimates of quantities of foodstuff actually used, and thereby reflect the consuming habits of the family.

Calculations of Cash Expenses and Receipts

Because some cash expenses do not vary directly with changes in the farm organization, it is not necessary to estimate what they would be under the reorganized plan. These include such items as taxes, interest on mortgaged indebtedness, and rent. If account records are available, these items will be available. If not, they must be computed from information supplied by the operator. There are other expenses which may or may not vary with changes in the organization. In this class are expenses for the automobile, machinery and equipment, buildings and fences, etc. If these items are not affected by the changes in the organization, they, too, can be obtained from the account record. On some farms, particularly on those of new clients, there are no records, and all items of expense must be estimated. The operator can usually furnish some information from memory, and records from other farms in the area may be used as guides.

Some crop and livestock expenses, however, tend to vary directly with the organization. Crop expenses have been summarized in table 15.

Material and service expense for each of the crops was not shown, but has been totaled and entered in the column under "Amount." Seeds supplied by the farm are not included. Prices used in computing values are listed in table 9.

In estimating livestock expense other than that for feed, the farm-account record was used. Other livestock expenses are shown as one item, because no breakdown was made in the record summaries giving veterinary expense, medicine, and other services separately. Where the livestock expense item appeared to be abnormal, compared to that shown by

farm-management studies in nearby areas, data from the farm record were adjusted slightly. Estimated change in livestock expense, other than feed, which would accompany a change in the livestock system was prorated on an animal-unit basis. This is a rough measure, but owing to the character of the data it appears to be the best available. On those farms not having account records, it would be necessary to estimate livestock expense item by item from information supplied by the operator.

Table 15.- Crop expenses

Item	Present		Plan No. 1		Plan No. 2	
	Amount	Value	Amount	Value	Amount	Value
	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars
Twine (small grain)	66	4.62	45	3.15	57	4.00
Twine (corn stover)	14	1.00	15	1.05	15	1.05
Alfalfa seed 1/	2 $\frac{1}{2}$	.88	41	14.35	26	9.10
Clover seed 1/	96	19.20	-	-	-	-
	Bushels		Bushels		Bushels	
Seed corn	1	7.00	2 $\frac{1}{2}$	17.50	3	21.00
Potato spray	-	4.50	-	3.00	-	4.50
Threshing	-	50.05	-	19.60	-	22.80
Total		67.25		58.65		62.45

1/ Annual charge.

The budget has now been carried to the point where receipts and expenses can be summarized in a statement of net operating returns. For purposes of comparing proposed plans with the present plan, the data have been presented in table 16. Here, the quantities and values of products sold are itemized, and a summary of farm cash expenses is given.

Budgeting Alternative Organizations

As many alternative plans as possible should be developed so that no possibilities will be overlooked. Only in this way can one be assured that the best plan has been selected. The farm, the characteristics of the family, or the operator's resources will very often limit the number of possible alternative plans. This is especially true in the case of FSA borrowers. Alternatives may also be limited in an area such as Stearns County where climatic, market, and other conditions may be favorable to but few types of farming.

Table 16.- Summary of cash receipts and expenses

Item	Unit	Unit price	Present		Plan No. 1		Plan No. 2	
			Quantity	Value	Quantity	Value	Quantity	Value
		Cents		Dollars		Dollars		Dollars
<u>Receipts</u>								
Butterfat ...	Lb.	30	1,240	372	1,790	537	1,320	396
Veal calves ..	do.	7 $\frac{1}{2}$	1,820	136	2,150	161	1,820	136
Cull cows	do.	4	2,700	108	2,700	108	2,700	108
Hogs	do.	7	2,800	196	2,800	196	4,400	308
Cull sows	do.	5	500	25	500	25	750	37
Broilers	do.	12	350	42	350	42	350	42
Cull hens	do.	8	200	16	200	16	200	16
Eggs	Doz.	18	120	22	120	22	120	22
Potatoes	Bu.	50	90	45	60	30	90	45
ACP payments..				1/ 60		1/ 60		1/ 60
Gross receipts				1,022		1,197		1,170
<u>Expenses</u>								
Automobile				70		70		70
Machinery & equipment ...				30		30		30
Buildings & fences				30		30		30
Feed for livestock				10		10		10
Other livestock expense ..				45		45		48
Crop expense				67		59		62
Taxes, interest,								
insurance				120		120		120
General farm				10		10		10
Total expenses				382		374		380
Net cash operating return:				640		823		790

1/ Assumed on basis of 1938 participation.

At least one possible alternative plan of operation was available to the farm used as an illustration. Thus far, only the one proposed plan has been discussed. Data for an alternative plan can be found in each of the tables numbered 10 to 16. Arranging the material in this way affords a more ready comparison among the several plans. In plan No. 2, the cropping system would include 20 instead of 17 acres of corn, 20 instead of 17 acres of small grain, and 10 instead of 17 acres of alfalfa (table 10). This crop arrangement provides only a slight increase in roughage compared to the present cropping system, but provides for the production of 53,000

pounds of grain as compared to 43,500 pounds at present. Under this condition the dairy enterprise would remain unchanged, but allowing the same feeding standard for each class of livestock, there would be a surplus of grain. Accordingly, it has been suggested in plan No. 2 that the hog enterprise be expanded to produce 27 instead of 18 200-pound hogs. Other livestock numbers would remain the same.

The alternative plan differs from the present one in that the cropping system would be better balanced, more and a higher quality of roughage would be produced and more concentrates would be available, making it possible to feed more hogs. Labor requirements for the cropping system would be slightly greater. Plan No. 2 differs from plan No. 1 in that less roughage and more concentrates are produced. This would result in a smaller dairy and a larger hog enterprise. The cropping system under the alternative plan would be somewhat more complex than the proposed system in that a five-field system, rather than a three-field system, would be required (fig. 4).

The suggested feed distribution under plan No. 2 differs somewhat from that of plan No. 1 (table 12). Under the second plan, the dairy ration includes less alfalfa and more native hay and corn stover, but the same amount of concentrates. As a result the nutritive ratio in the dairy ration would be wider (less rich in proteins) than the first plan but narrower than the one used at present. The probable effect of the ration in the alternative reorganization would be as follows. Present production of butterfat per cow, 120 pounds, is about 90 percent of what could be expected with an average farm ration containing a nutritive ratio of 1:8.0. Using this proportion, expected production would be 133 pounds of butterfat. In plan No. 2 butterfat production per cow is conservatively estimated at 130 pounds. The ration suggested in plan No. 2 could be improved by including additional high protein feeds. But since the nutritive ratio is already nearly average, it is doubtful that narrowing it still further would pay when the character of the cows and the additional cost of purchasing feed are considered. It will, however, offer a possibility to be considered after the plan is in operation.

A comparison between the present and the two proposed organizations with respect to cash-crop expenses is shown in table 15. Data on the production and disposal of livestock and livestock products are shown in table 14, and a summary of cash receipts and expenses is given in table 16. The net-cash operating returns are somewhat less (\$790) for plan No. 2 than for plan No. 1 (\$823), though the difference in returns between the two is not sufficiently large to be significant. The first plan is to be preferred because it includes a greater margin of safety (variability in yields) in roughage production for the dairy herd and presents a better adjustment of the livestock system to the facilities of the farm. Despite the fact that the proposed plan includes 18 dairy cows compared to 16 in plan No. 2, the livestock system under the latter plan would be likely to press more seriously against the roughage production during seasons of low yields. Wherever a choice exists, a greater margin of safety is to be desired in the production of roughage than in concentrates, because concentrates can be more easily procured off the farm.

